United States Department of the Interior s

FISH AND WILDLIFE SERVICE I
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Carlsbad Fish and Wildlife Office v
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In Reply Refer To: p
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Mr. John Holt I
Environmental Manager I
Department of Energy, Western Area Power Administration I
Desert Southwest Customer Service Region I
P.O. Box 6457 I
Phoenix, IArizona I85005-6457 I

Subject: .I Biological Opinion on the Proposed Rice Solar Energy Project, I
Riverside County, California I

Dear Mr. Holt: I

This letter transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the I construction, operation, and maintenance of the proposed Rice Solar Energy Project (project), I located in Riverside County, California. IThis biological opinion analyzes the effects of the I project on the federally threatened desert tortoise (*Gopherus agassizii*) in accordance with I section 7 of the Endangered Species Act of 1973 (ESA, Act), as amended (16 U.S.C. 1531 *et seq.*). Your request for formal consultation dated and received on January 18, 2011, constitutes I the date consultation was initiated. I

In addition, the Service has a legal mandate and trust responsibility to maintain healthy, I migratory bird populations for the benefit of the American public pursuant to the Migratory Bird I Treaty Act (16 U.S.C. 703 *et seq.*) and the Bald and Golden Eagle Protection Act (16 U.S.C. I 668-668d). IAs conveyed in our comment letter on the draft environmental impact statement and I staff assessment for the project, we are concerned about potential adverse impacts power tower I technology may have on wildlife, particularly golden and bald eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively), other raptors, migratory and resident birds, and bats. IUnder I a separate cover, we are sending you a letter detailing our concerns for these non-ESA species. I

Because the construction, operation, maintenance, and decommissioning of the project and I potential translocation of desert tortoises will not occur within designated critical habitat for the I species, no adverse effects to the primary constituent elements of critical habitat are anticipated. I Therefore, we do not address desert tortoise critical habitat in this biological opinion. I

A query of the Arizona Heritage Data Management System identified critical habitat for I razorback sucker (*Xyrauchen texanus*) within a 4.8 kilometer (km) [3 mile (mi)] radius of the site I for the passive reflector component of the project; however, the proposed action will not affect I

the species or its habitat. Because no adverse effects to the razorback sucker or the primary constituent elements of critical habitat are anticipated, we do not address this species or its critical habitat in this biological opinion.

This biological opinion is primarily based on information provided in the following documents and communications: 1) *Presence/absence survey for the desert tortoise* (*Gopherus agassizii*) *on the proposed Rice Solar Energy Project* (CH2M HILL 2009); 2) *Draft desert tortoise relocation/translocation plan for the Rice Solar Energy Project* (CH2M HILL 2010a); 3) *Draft raven management plan for the Rice Solar Energy Project* (CH2M HILL 2010b); 4) *Draft environmental impact statement/staff assessment for the Solar Reserve LLC* [Solar Reserve] *Rice Solar Energy Project* [DEIS/SA; California Energy Commission (CEC) 2010a]; 5) *Rice Solar Energy Project commission decision* (CEC 2010b); 6) *Biological assessment for the Rice Solar Energy Project* [Western Area Power Administration (Western) 2011a]; 7) supplemental materials provided during the consultation process; 8) electronic transmissions from Western, Solar Reserve, CH2M HILL, and Bureau of Land Management (BLM); and 9) pertinent literature contained in our files. The project file for this consultation is located at the Carlsbad Fish and Wildlife Office (CFWO).

The incidental take statement that accompanies this biological opinion exempts take of the desert tortoise carried out in accordance with the terms and conditions of the incidental take statement. This biological opinion and its incidental take statement do not authorize other actions nor do they address the restrictions or requirements of other applicable laws.

CONSULTATION HISTORY

For the purposes of this biological opinion, Western, on behalf of the Department of Energy (DOE), is the lead Federal agency with BLM acting as the cooperating agency; Rice Solar Energy, LLC, a wholly owned subsidiary of Solar Reserve, LLC, is the applicant. In September 2009, the contractor to Solar Reserve, CH2M HILL, contacted the Carlsbad Fish and Wildlife Office (CFWO) regarding the project and requested technical assistance, while in the process of preparing the application for certification before the CEC. CH2M HILL subsequently submitted the desert tortoise survey report (CH2M HILL 2009) to CFWO.

In March 2010, representatives of the BLM, Western, and applicant attended a Data Request Response Workshop to discuss the CEC staff's requests for additional data, including data regarding the desert tortoise and consultation under the Act for the project. Subsequent conference calls were conducted to discuss outstanding biological resource issues related to the project, including desert tortoise, the consultation process under the Act, and California State Endangered Species Act compliance. Throughout the coordination on the project, the Service provided desert tortoise survey protocols (Service 2010a) and translocation guidance (Service 2010b) to the applicant and its contractor as these documents were updated.

In late March 2010, Western initiated informal consultation with CFWO. Western submitted a biological assessment to the Service in July 2010 and requested initiation of formal consultation;

however, in August 2010, Western requested that consultation be suspended until the CEC analysis and conditions of certification for the project were finalized. The draft environmental impact statement/staff assessment for project (DEIS/SA; CEC 2010a) was released in October 2010 and the commission decision (CEC 2010b) was issued in December 2010. Western subsequently submitted a revised biological assessment (Western 2011a) and requested initiation of consultation in January 2011.

In preparing this biological opinion, we provided a draft to Western and BLM for review and comment on June 21, 2011. A copy of the draft was subsequently provided to the applicant, and Western provided us with the combined comments from those entities for consideration in our preparation of the final biological opinion. We considered and incorporated comments received from Western, BLM, and the applicant into this biological opinion, as appropriate.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following description of the proposed action is a summary of the biological assessment (Western 2011a, b), DEIS/SA (CEC 2010a), and CEC decision (CEC 2010b), other supporting documents listed above, subsequent language clarification obtained via email, and further modifications based on comments received from Western and BLM on the draft biological opinion.

Introduction

The proposed action is Western's issuance of a generation interconnection for the Rice Solar Energy Project and the construction and operation of a new switchyard, including communication hardware to link the switchyard to the rest of Western's transmission system. In addition, included as part of the proposed action, is BLM's consideration of the application for a right-of-way (ROW) grant for the new transmission line and interconnection substation (switchyard) (CACA 051022). Authorization of the ROW grant for the project would require a resource management land use plan amendment to the California Desert Conservation Area (CDCA) plan, as amended (BLM 1999). Western is the lead Federal agency for formal consultation and BLM is a cooperating agency.

The interrelated and interdependent action undertaken by the applicant is the solar energy generating facility, which is to be constructed, owned, operated, and maintained by Rice Solar Energy. Because the project would be licensed under the CEC's certification process, the applicant would be required to adhere to all the conditions of certification, which were developed in coordination with the Western, BLM, Service, California Department of Fish and Game (CDFG), and applicant. The conditions are described in detail in the biological assessment (Western 2011a) and commission decision (CEC 2010b). These are enforceable conditions, compliance with which would be monitored by the CEC's Compliance Unit and in coordination with Western, BLM, Service, and CDFG.

The solar energy generating facility would be located on 553.6 hectares (ha) [1,368 acres (ac)] of a larger 1,345.6 ha (3,325 ac) parcel of privately owned lands (ownership parcel) in unincorporated eastern Riverside County. Private lands not impacted by the project, but within the ownership parcel would not be fenced, developed, or disturbed. A 16.1 km (10 mi), 230-kilovolt (kV) generator tie-line (gen-tie) and interconnection switchyard to connect the solar generating facility with the existing Western Parker-Blythe #2 transmission line would cross approximately 40.1 ha (99 ac) of BLM-managed lands. Telecommunications facilities would be required on BLM-managed lands and on the Colorado River Indian Reservation in Arizona. In total, the project will permanently disturb up to 586.1 ha (1,448.4 ac), all of which is desert tortoise habitat.

The project site is immediately south of State Route (SR) 62, which parallels a portion of the Arizona-California Railroad and the Colorado River Aqueduct, near the junction of SR 62 and Blythe-Midland Road, and near the abandoned town of Rice, California. The nearest occupied residence is approximately 24.1 km (15 mi) northeast at the rural crossroads community of Vidal Junction, California. The nearest towns are Parker, Arizona, approximately 51.5 km (32 mi) to the east, and Blythe, California, approximately 64.4 km (40 mi) to the southeast.

The project would be capable of producing approximately 450,000 megawatt hours of renewable energy annually, with a nominal net-generating capacity of 150 megawatts (MW). The facility would use concentrating solar power technology, with a central receiver tower and an integrated thermal storage system. This technology generates power from sunlight by focusing energy from a field of sun-tracking mirrors called heliostats onto a central receiver commonly referred to as a power tower.

As stated above, the project will permanently disturb up to 586.1 ha (1,448.4 ac); Table 1 identifies each project component by landownership. The project design incorporates the following principal elements within a 553.6 ha (1,368.0 ac) portion of the ownership parcel:

- Heliostat field with up to 17,500 solar-tracking heliostats, each approximately 7.3 meters (m) [24 feet (ft)] tall by 8.5 m (28 ft) wide, arranged in a circular array that will reflect and concentrate the energy from the sun onto a tower-mounted receiver.
- A concrete central tower approximately 164.6 m (540 ft) tall, upon which is mounted a receiver approximately 100 ft tall topped with a small maintenance crane, for an overall structure height of 199.0 m (653 ft).
- A liquid salt storage system featuring insulated “hot” and “cold” salt storage tanks.
- A steam turbine generator system rated at 150 MW (net).
- A 20-cell air-cooled condenser to provide water-free cooling and condensing of the steam turbine exhaust.
- Two onsite water wells to provide water for heliostat washing, steam-cycle makeup and other process uses in an amount not expected to exceed 22 hectare-m (ha-m) (180 ac-ft) per year.
- Three lined evaporation ponds of approximately 2 ha (5 ac) each to capture all process wastewater discharge from the project’s water treatment system, process blowdown, and stormwater drainage from within equipment areas.

- Stormwater drainage features to channelize offsite stormwater flows from upstream of the project site, diverting offsite stormwater around the project site, and rejoining the natural flow channels to the south of the property.
- Two emergency diesel generators and associated equipment to supply emergency backup power for the safe shutdown and protection of vital equipment and facilities.
- Onsite fire protection facilities, which consist of two sets of electric-motor-driven and diesel-engine-driven fire pumps and related fire detection and protection equipment.
- Various buildings for plant control room, administration offices, maintenance and storage, and crew comfort facilities.
- Physical security systems including perimeter fencing, closed-circuit television, and other means to protect against unwanted entry consistent with electric utility and Department of Homeland Security requirements.

Project components on BLM-managed and Tribal lands:

- A 16.1 km (10 mi), 230-kilovolt (kV) gen-tie to connect the solar energy generating facility with the existing Western Parker-Blythe #2 transmission line. The gen-tie alignment would follow an existing, unpaved route for approximately 8.7 km (5.4 mi) and require construction of approximately 7.4 km (4.6 mi) of single-lane dirt access road for construction and maintenance purposes. A new interconnection substation, approximately 1.2 ha (3 ac) in size, for the gen-tie to Western's system would be constructed adjacent to the existing transmission line. The gen-tie and substation would be constructed on BLM-managed lands.
- Extension of the existing low-voltage power distribution network from the solar generating facility, spanning about 1.6 km (1 mi) including a section of less than 60 m (200 ft) across BLM-managed land, to supply ancillary facilities.
- Microwave communications facilities on the project site and at Western's Black Point Communications Site (on BLM-managed lands in California) by adding a dish to an existing tower and a passive reflector at an intermediate site (located in Arizona on Tribal lands) to allow transmittal of data from the solar generating facility to the Black Point Communications Site.

Construction

Construction of the project is planned to begin in 2011, with an anticipated construction period of approximately 30 months; commercial operation is targeted for third quarter 2013. The applicant has entered into a power purchase agreement with Pacific Gas and Electric Company for delivery of power from the project.

General Project Description

The solar energy generating facility would include the solar collection field, power block, administration and maintenance buildings, switchyard, two water wells, two leach fields, and three evaporation ponds. One of the onsite wells is an existing well that would be modified for use; a second new well would be drilled. Construction and operations access to the site will be

directly off of SR 62. A temporary logistics area located between SR 62 and the project site would be used during construction. This area would include a temporary parking area and a construction office, laydown, and heliostat assembly area and would occur within the area subject to grading, but would be disassembled prior to operation. Power during construction would be provided from onsite generators. The structures in the temporary logistics area would be removed following construction. This area would be restored but the habitat value would be limited because it is located between the project site and the aqueduct/railroad/SR 62 corridor.

Table 1. Impacts to desert tortoise habitat by landownership

Item	Calculation	Acres
Impacts to Desert Tortoise Habitat within Solar Reserve Ownership Parcel		
Within permanent fenceline		
Heliostat field	CAD drawing	1,329.0
Evaporation ponds and pond fencing	CAD drawing	32.8
North administration building and road	CAD drawing	6.2
Subtract concrete apron (not DT habitat)	870' x 300' per aerial photo	-6.0
Subtotal		1,362.0
Outside Permanent Fenceline/Inside Solar Reserve Ownership Parcel		
East construction laydown	CAD drawing	20.9
West construction laydown	CAD drawing	4.8
East channels outside fence	75' wide channel + diffuser area	13.6
West channels outside fence	35' wide channel + diffuser area	5.4
Transmission line access road	24' (road+buffer) x 5,065 ft	2.8
Transmission towers	100' x 100' area x 9 towers	2.1
Subtotal		49.5
Impacts to Desert Tortoise Habitat Outside Solar Reserve Ownership Parcel (BLM and other private)		
Transmission line access road	24' (road+buffer) x 3.6 mi	10.5
Transmission towers	100' x 100' area x 81 towers	18.6
Transmission line pull sites	100' x 200' x 10 sites	4.6
Switchyard + 50-ft buffer	400' x 265' plus 50-ft buffer	3.3
Subtotal		36.9
Total Desert Tortoise Habitat Affected		1,448.4

A perimeter security fence that incorporates the desert tortoise exclusion fence constructed in accordance with the most recent Service guidance (Service 2009a) would surround the project site. The logistics area located between the project site and SR 62 would be temporarily fenced during construction activities. Following construction, the temporary fencing around the logistics area would be removed. The perimeter access road around the heliostat field would act as a small berm and would be surrounded by an unlined ditch along the northern half of the heliostat field to direct stormwater around the project site. A dirt, gravel, or paved road would be located within the perimeter security fence on the raised berm on the inside of the ditch. This

road would be graded as needed for maintenance. In the southern half of the heliostat field, the perimeter road would be at grade to allow unimpeded flow of stormwater through the site.

Construction will likely include a peak workforce of approximately 438 onsite personnel and work would occur between 5 a.m. and 7 p.m. on weekdays and Saturdays. Additional hours, including night work would be needed to complete tasks such as continuous concrete pours and to avoid extreme temperatures. Up to 47 full-time employees would be required during operations over the operating life of 30 years.

Gen-tie Construction

The 230-kV electrical gen-tie would be approximately 16.1 km (10 mi) long and extends from the south edge of the project site, east to the southeast corner of the ownership parcel, and then across Rice Valley to the existing Western Blythe-Parker #2 161 kV/230 kV transmission line near the base of the Riverside Mountains. Approximately 12.9 km (8.0 mi) of the new gen-tie would be located on BLM-managed land; the remainder is within the boundary of ownership parcel. Construction of the first 7.4 km (4.6 mi) of the gen-tie originating from the project site would require the construction of a 3.7 m (12.0 ft) wide unpaved service road. The remaining 8.7 km (5.4 mi) of the line would follow an existing dirt road (Rice Valley Road) to the interconnection switchyard. The existing dirt road likely would not need to be widened or improved for use. Steel, 25.9 to 35.1 m (85.0 to 115.0 ft)-tall monopoles would be installed approximately every 182.9 m (600 ft) for a total of 90 poles. Each pole would be supported by a concrete base foundation.

Road construction for the approximately 7.4 km (4.6 mi) of new dirt road would be completed with a grader. The majority of the equipment staging for the pole installation (i.e., drill rigs, concrete trucks, and trailers with pole section) would be from the dirt road. After the foundations are drilled and poured, the poles would be assembled in sections. The electrical gen-tie (conductors) would be strung from rubber-tired spooling trucks positioned near the towers.

The interconnection of the project to Western's Parker-Blythe #2 transmission line would potentially require upgrades to be performed to downstream transmission facilities connected to Western's system associated with Southern California Edison and Imperial Irrigation District's transmission systems. These upgrades are expected to consist of modifications to existing facilities that could include reconductoring, substation switchgear and transformer upgrades, and system protection control modifications. However, because these upgrades are planned and managed using a time-priority queue of projects generated on a first-come, first-served basis, the certainty as to whether or not the potential upgrades associated with the Rice project will be constructed is unknown (B. Werner, Western, pers. comm. 2011). Therefore, this component of the project is not analyzed in this biological opinion.

Interconnection Switchyard Construction

The switchyard would be included in the BLM ROW grant for the new gen-tie. At the interconnection site, a new 80.8 by 121.9 m (265 by 400 ft) switchyard would be constructed by

Western on less than 1.2 ha (3.0 ac) of BLM-managed land. A perimeter security fence that incorporates desert tortoise exclusion fence constructed in accordance with the most recent Service guidance (Service 2009a) would surround the interconnection switchyard site.

Communication Facilities

To provide two-way data communication from the interconnection switchyard, a monopole or steel tower with a microwave dish would be installed within the fenced area of the yard adjacent to the control building that houses the radio equipment. A passive reflector would be installed to direct the microwave beam to Western's existing Black Point Communication Site.

The Black Point Communication Site is located within the BLM's existing Big Maria Communication Site southeast of the project site. Because the BLM's Yuma Field Office (Colorado River District) manages the site, Western would coordinate any required realty actions with that office. The site is at 190.5 m (625 ft) in elevation on a rocky mountain just west of the Colorado River floodplain. Access to the Black Point facility is via an existing unpaved road off U.S. 95 and a spur road that provides access to four existing facilities at this site. Because of the rough road conditions, maximum travel speeds would be less than 24.1 kilometers per hour (kph) [15.0 miles per hour (mph)]. Addition of a dish to the existing tower would involve use of a pickup truck or similar vehicle on the existing road over 1 to 3 days.

The passive reflector would be constructed on the Colorado River Indian Reservation on the east side of the Colorado River floodplain in Arizona. Western would pursue a lease or other instrument with the Colorado River Indian Tribes' tribal government for long-term use of the site. Access would be on existing roads to the project site. Typical installation of a passive reflector includes construction of four to eight 0.9 square meters (m^2) [2 square ft (ft^2)] concrete foundations in augured holes upon which the reflector is constructed. Construction of this component would take 4 to 5 days, using a truck or backhoe-mounted power auger, a cement mixer or ready mix truck, and trucks to transport supplies.

Operations and Maintenance

Operations of the solar energy generating facility would require that raw water be drawn daily from two onsite wells, located within the perimeter security fence. Groundwater would go through a treatment system for use as boiler makeup water and for washing the heliostats; water consumption is estimated at no more than 22.2 ha-m (180 ac-ft) per year. Three evaporation ponds of approximately 2.0 ha (5.0 ac) each are included in the project design; these would be used for boiler commissioning and emergency outfalls from any of the processes.

Operations and maintenance (O&M) requirements necessitate the washing of the heliostats at night on approximately 260 days per year. Best management practices (BMPs) for the use of wash water are outlined in the Stormwater Pollution Prevention Plan (SWPPP). The water used for this process would be of relatively high quality but will contain trace amounts of chemicals such as oxygen scavengers, which are not expected to result in substantial changes in water

quality. A pressure washer or other method would be used to wash the heliostats to minimize the amount of water used, and runoff would be captured in the onsite basin catchment system and the earthen berm surrounding the project site. Due to the high evaporation rates in the area and the minimal amount of water used, it is likely that wash water will evaporate at or just below the ground surface within the immediate area of the heliostat. By implementing sound engineering practices and BMPs as part of the construction and operation of the project, and because stormwater discharge during construction will adhere to an approved SWPPP and to State water quality standards, no significant impacts to surface or subsurface water quality are expected during construction or O&M activities associated with the project. Onsite stormwater runoff would be directed toward onsite detention basins and offsite stormwater would be directed around the project site.

Routine O&M activities outside of the perimeter security fence and along the access road and gen-tie ROW would include periodic cleaning of gen-tie conductors and replacement and/or repair of equipment damaged by wind, dust, or accidents, and repairs to maintain a drivable surface along the access roads, if damaged, and repair of the perimeter security fence. Such activities are anticipated to occur throughout the year as needed and would be determined by periodic (at least annual) inspection of these components. The existing and newly constructed access road for the gen-tie would provide the long-term access for O&M.

No O&M of the drainage channels outside the perimeter security fence of the project site are required, nor would any O&M outside the perimeter security fence of the switchyard be required. However, maintenance and repair of the fences themselves may be necessary periodically over the life of the project.

Routine O&M at the Black Point Communication Site would be performed in conjunction with maintenance of the facility itself, namely periodic inspection and adjustment. O&M at the passive reflector site would be limited to repair of vandalism or infrequent adjustment. Access for O&M activities at these sites would be along existing routes.

Decommissioning

Following the operational life of 30 years, the applicant would perform site closure activities to meet Federal and State requirements for the rehabilitation and revegetation of the project site after decommissioning. The procedures to be used for project decommissioning and restoration would be in accordance with a facility closure plan. Under this plan, it is anticipated that all aboveground structures and facilities would be removed to a depth below grade, and taken offsite for recycling or disposal. Some concrete, piping, and other materials constructed below grade may be left in place. Areas that had been graded would be restored to original contours, vegetation would be restored, and weed control would be implemented. In addition, transmission infrastructure would be removed to eliminate perching and nesting subsidies for avian predators of desert tortoises. The facility closure plan would be submitted to the CEC, Western, and BLM for review and approval prior to a closure of the project site. When the CEC, Western, and BLM begin to consider decommissioning, they will contact the Service to

determine if additional consultation, pursuant to section 7(a)(2) of the Act, would be appropriate. Consequently, because the facility closure plan has not been developed, we will not analyze the potential effects of decommissioning on the desert tortoise in this biological opinion.

Conservation Measures

The proposed action includes conservation measures that would be implemented to avoid, minimize, and offset potential adverse effects to the desert tortoise. In addition, implementation and effectiveness monitoring is incorporated as part of the proposed action. As discussed above, because the project would be licensed under the CEC's certification process, the applicant would be required to prepare a biological resources mitigation implementation monitoring plan (BIO-7) and the project would be subject to the CEC's project lifetime (construction and operation) compliance review process. Under this process, the CEC would assign a Compliance Project Manager (CPM) who would review and manage project compliance with the CEC's conditions of certification (Western 2011a, CEC 2010b) in coordination with the Western, BLM, Service, and CDFG. Each of the conditions of certification contains a main condition and a separate element called "Verification" (BIO-9), which describes the means by which the CEC CPM would verify compliance with that specific measure. The CEC CPM then monitors each aspect of compliance through the duration of the CEC license and the verification clauses indicate frequency of reporting to the CEC.

Only the conditions of certification that pertain to or may affect the federally threatened desert tortoise are applicable to our analysis (Table 2). Thus, we are incorporating by reference into this biological opinion, the conditions of certification contained in the biological assessment (Western 2011a) and CEC's decision document as the conservation measures that will be implemented by Western, BLM, and the applicant to avoid, minimize, and offset the impacts to the desert tortoise associated with the project (see CEC 2010b). For those conditions that are not specific to the desert tortoise, but are listed herein, Western, BLM, and the applicant must ensure that implementation of those measures do not result in direct or indirect impacts to the species.

In some cases, we have modified the language to improve clarity, but we have not changed the intent of the measures that Western, BLM, and applicant have proposed. The description of the proposed action, including CEC's conditions of certification and the additional clarifications specified herein, provide the basis of the effects analysis provided in this biological opinion. The commission decision (CEC 2010b) includes additional measures to offset project impacts on rare and sensitive species and natural communities that would be implemented to reduce further impacts to biological resources, including those associated with dust, light, and noise, resulting from the project.

All conservation measures specific to the desert tortoise will adhere to the Service's most recent guidance, which now consists of the field manual (Service 2009a), and translocation and other guidance for the Mojave population (Service 2010a, Service 2010b). Any revised guidance issued prior to commencement of construction activities would supersede those identified herein.

The Service would advise Western, BLM, and the applicant of any applicable revisions that should be followed during construction and O&M activities.

Impact Avoidance and Minimization Measures (BIO-8): This condition specifies the measures that will be implemented to manage the project site and related facilities to avoid or minimize impacts to biological resources, including the desert tortoise. To clarify, these measures will also be implemented during all ground-disturbing construction and O&M activities.

Table 2. CEC conditions of certification for the Rice Solar Energy Project

Condition of Certification	Condition Title	Desert Tortoise-Related
BIO-1	Designated Biologist Selection	Yes
BIO-2	Designated Biologist Duties	Yes
BIO-3	Biological Monitor Qualification	Yes
BIO-4	Biological Monitor Duties	Yes
BIO-5	Designated Biologist and Biological Monitor Authority	Yes
BIO-6	Worker Environmental Awareness Program (WEAP)	Yes
BIO-7	Biological Resources Mitigation Implementation and Monitoring Plan	Yes
BIO-8	Impact Avoidance and Minimization Measures	Yes
BIO-9	Compliance Verification	Yes
BIO-10	Revegetation Plan and compensation for impacts to native vegetation communities	No
BIO-11	Weed Management Plan	No
BIO-14	Desert Tortoise Clearance Surveys and Exclusion Fencing	Yes
BIO-15	Desert Tortoise Translocation Plan	Yes
BIO-16	Desert Tortoise Compensatory Mitigation	Yes
BIO-17	Raven Monitoring, Management, and Control Plan	Yes
BIO-21	Fence Locations: Logistics, Laydown Area, and Access Road	Yes
BIO-24	Evaporation Pond Design, Monitoring, and Management Plan	No

Desert Tortoise Clearance Surveys and Fencing (BIO-14): This condition specifies the procedures, including seasonal restrictions, for conducting tortoise clearance surveys and handling and moving tortoise out of the disturbance area during construction activities. BIO-14 also specifies that temporary tortoise exclusion fencing would be installed along linear features unless a biological monitor is present during construction activities. To clarify, these procedures

would also be implemented in areas not enclosed with desert tortoise exclusion fencing during any new ground-disturbing activities associated with O&M of the access road, gen-tie alignment, rerouted drainage channels off the project site, and perimeter security fences. Clearance surveys and handling of individuals would be conducted and desert tortoise exclusion fencing would be constructed in accordance with the draft desert tortoise relocation/translocation plan for the project (CH2M HILL 2010a), as finalized and approved, and the most recent version of the Service's field manual (Service 2009a).

Prior to clearance surveys and the onset of any vegetation clearing or grubbing on the project sites, the applicant would install perimeter security fencing and desert tortoise exclusion fencing around the project site. All fence alignments would be flagged and surveyed within 24 hours prior to the initiation of fence construction.

Clearance surveys of the linear project components (e.g., perimeter security fence and desert tortoise exclusion fence, gen-tie alignment, access roads) may be conducted during any season and would be conducted by the Authorized Biologist(s) and Biological Monitor(s) in accordance with the qualifications and duties outlined in BIO1 through BIO-5. Clearance surveys for fences and other linear features would provide 100-percent coverage of all areas to be disturbed and an additional transect along both sides of the fence alignment. Prior to the clearance surveys, the applicant would provide a graphic clearly depicting the final limits of construction disturbance for the fence installation.

Desert tortoises located during clearance surveys of linear facilities outside of the project sites (i.e., along the gen-tie or access roads) would be moved out of harm's way to within 500.0 m (1,640.4 ft) of the disturbance area. Any desert tortoises located during clearance surveys of linear facilities conducted during the inactive season (i.e., along perimeter and/or desert tortoise exclusion fence) would be moved out of harm's way to within 500.0 m (1,640.4 ft) inside of the fence and be translocated during the active season. If the individual is inaccessible because of its location underground, the burrow would be fenced with temporary exclusion fencing at a distance of 100 m (328 ft) from the burrow to provide sufficient space for the individual until the following active season. The burrow and area within the fence would be monitored periodically to ensure the individual is not improperly confined should it become active.

Following installation of the desert tortoise exclusion fencing for the permanent security fencing and temporary fencing, the fencing would be inspected and repaired, as necessary, on a daily basis to ensure its integrity. If desert tortoises were moved out of harm's way during fence construction, permanent and temporary fencing would be inspected at least 2 times a day for the first 7 days to ensure a recently moved individual has not been trapped within or is pacing the fence. Thereafter, permanent fencing would be inspected monthly and during and within 24 hours following all major rainfall events. Inspections and repairs of permanent security fencing would occur over the life of the project.

Temporary fencing will be inspected weekly and, where drainages intersect the fencing, during and within 24 hours following major rainfall events. All temporary fencing will be repaired

immediately upon discovery and, if the fence may have permitted desert tortoises to enter the site while damaged, the Authorized Biologist will survey the area for any individuals.

In accordance with the most recent version of the Service's desert tortoise field manual (Chapter 6 in Service 2009a), clearance surveys of the project site would be performed during the active season and consist of two consecutive surveys covering 100 percent the project area by walking transects no more than 4.6 m (15 ft) apart. If a desert tortoise is located on the second survey, a third survey would be conducted. All desert tortoises located within the project areas would be translocated pursuant to the final translocation plan.

Desert Tortoise Translocation Plan (BIO-15): This condition specifies the desert tortoise translocation plan will be consistent with Service-approved guidelines, and that the final plan will include all revisions deemed necessary by Western, BLM, Service, CDFG, and CEC, and be approved by CEC in consultation with the agencies prior to site mobilization. To clarify, the translocation plan would be drafted in accordance with the most recent Service guidance (Service 2010a) and any subsequent guidance, and the draft translocation plan for the project (CH2M HILL 2010a), as finalized and approved, would be revised according to site-specific conditions on and adjacent to the proposed recipient (translocation) site and the number of individuals estimated to be translocated. The final translocation plan requires approval by the Service prior to initiation of any ground-disturbing construction activities and would be applicable to all phases of the project including preconstruction, construction, and O&M.

The translocation plan will provide detailed descriptions of such information as: 1) how and where desert tortoises located on the project site during construction would be moved out of harm's way or translocated; 2) the mapped location of the translocation recipient and control sites; 3) how and where quarantine pens would be constructed for the translocation process; and 4) a husbandry and monitoring plan for the quarantine period while awaiting blood test results. The translocation plan will also outline how disease prevalence within the translocated, recipient, and control populations would be documented and a 5-year monitoring plan. The level of detail required in the translocation plan would depend upon the number of desert tortoises actually translocated. For instance, if fewer than five are expected to be moved (which is currently anticipated), monitoring of resident and control desert tortoises and disease testing via blood samples would not be required.

Prior to translocation, desert tortoises would undergo varying levels of health assessments, depending on the number of individuals expected to be translocated and the distance they would be moved. Health assessments including blood samples for enzyme-linked immunosorbent assay (ELISA) testing for *Mycoplasma testudineum* or *M. agassizii* would be conducted prior to release for desert tortoises moved greater than 500.0 m (1,640.4 ft). All blood samples would be drawn between May 15 and October 31. If the Service's guidance related to this time period changes, then desert tortoises would be sampled accordingly. Desert tortoises to be translocated would remain in quarantine pens on or adjacent to the project site or on the recipient site pending the receipt of blood test results. Health assessments without blood samples would be performed on desert tortoises being moved less than 500 m (1,640 ft).

For the translocation site to be eligible for use, disease prevalence within the resident population cannot exceed 5 percent. To establish the baseline disease prevalence, the applicant would perform health assessments, including disease testing via blood samples for ELISA testing, on a minimum sample of individuals, which would be determined based on the abundance estimates for the recipient site. If the proposed recipient site cannot be used for translocation because of disease prevalence within the resident population, the applicant would identify an alternative recipient site and contact the Service and appropriate land manager for approval of the alternative site prior to its use. If the alternative recipient site is determined to be outside of the action area analyzed in this biological opinion, Western and BLM will contact the Service prior to any translocation activities to determine if reinitiation of consultation is necessary. All procedures relative to selection of an appropriate recipient site set forth in the Service's most recent translocation guidance must be followed.

Affixing transmitters and monitoring of translocated, resident, and control desert tortoises would be performed in accordance with the Service's most recent translocation guidance. In general, monitoring would entail, at a minimum, collection of data relative to survivorship, mortality rates, health status, body condition, movement of individuals, and predation of each of the affected populations. The applicant would also collect blood samples for ELISA testing annually from each transmittered desert tortoise at the recipient and control sites. All monitoring, including health assessments and follow-up blood sampling, and reporting would be consistent with the most recent Service guidance.

Action Area

The implementing regulations to section 7(a)(2) of the Act describe the action area to be all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). The action area is the area of potential direct or indirect effects of the proposed action and any interrelated or interdependent human activities; the direct and indirect effects of these activities include associated physical, chemical, and/or biological effects of considerable likelihood (Service and NMFS 1998). Indirect effects are those that are caused by the proposed action and are later in time but are still reasonably certain to occur (Service and NMFS 1986). Analyses of the environmental baseline, effects of the action on the species and designated critical habitat, cumulative effects, and the impacts of the incidental taking, are based upon the action area as determined by the Service (Service and NMFS 1998).

The action area for the project includes the areas of desert tortoise habitat that will be impacted by the project activities as a result of construction and O&M of the solar generating facility, gen-tie and switchyard, communications facilities, and other associated components [up to 586.1 ha (1,448.4 ac)]. For the purposes of this biological opinion, the project site is defined as the area inside and outside of the permanent fence that will be disturbed due to construction and O&M activities on the project components, perimeter security fence, rerouted drainage channels outside of the project site, and linear facilities (e.g., access roads, utility corridors, gen-tie line). Along the linear facilities outside of the project site, the action area also includes a distance of up

to 500.0 m (1,640.4 ft) on each side of centerline where any desert tortoises would be moved out of harm's way to avoid injury from construction or O&M-related activities.

The action area also includes the applicant's proposed desert tortoise recipient and control sites that will be identified in the desert tortoise translocation plan, and all contiguous desert tortoise habitat within 6.5 km (4.0 mi) of the release point of each translocated individual at the recipient site. By including habitat within 6.5 km (4.0 mi) of the release points, we are addressing the areas where desert tortoises may move following translocation[1]. The preferred recipient site is located immediately south of the project site. The total action area analyzed from this biological opinion equals 8,620.6 ha (21,302 ac; Figures 1A and 1B).

Finally, the action area encompasses lands that will be acquired to offset the loss of desert tortoise habitat resulting from construction and O&M of the project (BIO-16). The BLM's CDCA plan amendment for the Northern and Eastern Colorado Desert (NECO) Coordinated Management Plan (BLM 2002) established a habitat compensation ratio of 1 acre replaced to 1 acre affected (1:1) for lands outside of special management areas [e.g., desert tortoise critical habitat units (CHUs) and/or Desert Wildlife Management Areas (DWMAs)]. To be consistent with the intent of the NECO Plan, the 1:1 ratio also would be applied to impacts within the private ownership parcel. Because of the high number of desert tortoise observations along the gen-tie and the location of the project between BLM-designated wilderness areas, impacts along this project component would be compensated at a 3:1 ratio of replacement to affected acreage. Based on these ratios, acquisition of 615.9 ha (1,522.0 ac) would be required to offset impacts to desert tortoise habitat. All or a portion of the compensation land may consist of lands now held by the applicant, pending analysis of its suitability. In addition, the applicant would provide funding for initial improvement and long-term maintenance, enhancement, and management of the compensation lands for protection and enhancement of desert tortoise populations, and comply with other related requirements of this condition of certification (see CEC 2010b for all details pertaining to BIO-16).

STATUS OF THE SPECIES

The following section summarizes information about the desert tortoise relative to the legal/listing status, recovery planning, habitat characteristics, distribution and population trends, current threats, habitat and population connectivity, and status of critical habitat as discussed in the desert tortoise (Mojave population) recovery plan (Service 1994a), the draft revised recovery plan (Service 2008) and references therein, and the CDCA plan amendment for the Coachella Valley biological opinion (Service 2010c). In addition, to these documents, the 5-year review for the desert tortoise (Service 2010d) provides detailed information about these topics as well as the species' description, ecology, life history, and habitat affinities.

Legal/Listing Status: On August 20, 1980, the Service published a final rule listing the Beaver Dam Slope population of the desert tortoise in Utah as threatened and designated 6,734.0 ha (16,640.0 ac) of BLM-administered land as critical habitat (Service 1980). Major threats to the

[1] See "Effects of the Action" section for a discussion on post-translocation dispersal.

species identified in the rule included habitat destruction through development, overgrazing, and geothermal development, collection for pets, malicious killing, road kills, and competition with grazing or feral animals. In 1984, Defenders of Wildlife, Natural Resources Defense Council, and Environmental Defense Fund petitioned the Service to list the species as endangered. The following year, we determined that listing the desert tortoise range-wide as endangered was warranted, but higher priorities precluded any action.

In 1989, more information regarding threats to desert tortoises became available, prompting the Service to publish an emergency rule listing the Mojave population (all desert tortoises north and west of the Colorado River) as endangered (Service 1989). On April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened (Service 1990). Reasons for the determination included significant population declines, loss of habitat from construction projects such as roads, housing and energy developments, and conversion of native habitat to agriculture. Livestock grazing and off-highway vehicle (OHV) use were identified as factors causing degradation of additional habitat. Also cited as threatening the desert tortoise's continuing existence were: illegal collection by humans for pets or consumption; upper respiratory tract disease; predation on juvenile desert tortoises by common ravens, coyotes, and kit foxes; fire; and collisions with vehicles on paved and unpaved roads.

The species was listed as threatened under the California Endangered Species Act in 1989 and is considered a species at risk under California's Wildlife Action Plan (Bunn *et al.* 2006). CDFG manages over 19,670.0 ha (48,000.0 ac) of land for the conservation of the desert tortoise, and additional lands continue to be acquired for projects that result in impacts to the species.

On February 8, 1994, the Service designated approximately 2.6 million ha (6.4 million ac) of critical habitat for the Mojave population of the desert tortoise in portions of California, Nevada, Arizona, and Utah (Service 1994b), which became effective on March 10, 1994.

Recovery Plan for the Desert Tortoise: The first recovery plan for the desert tortoise was published in 1994 together with a companion document identifying 14 proposed DWMAs (Service 1994a) within 6 recovery units. The recovery plan serves as the basis and key strategy for recovery and delisting of the species. Within each DWMA, the recovery plan recommends implementation of reserve-level protection of desert tortoise populations and habitat, while maintaining and protecting other sensitive species and ecosystem functions. The recovery plan also recommends that DWMAs be designed to follow the accepted concepts of reserve design and be managed to restrict human activities that negatively affect desert tortoises (Service 1994a). The delisting criteria established by the recovery plan are:

1. The population within a recovery unit must exhibit a statistically significant upward trend or remain stationary for at least 25 years;

2. Enough habitat must be protected within a recovery unit or the habitat and desert tortoises must be managed intensively enough to ensure long-term viability;

3. Populations of desert tortoises within each recovery unit must be managed so discrete population growth rates (lambdas or λ) are maintained at or above 1.0;

4. Regulatory mechanisms or land management commitments that provide for long-term protection of desert tortoises and their habitat must be implemented; and

5. The population of the recovery unit is unlikely to need protection under the Act in the foreseeable future.

The recovery plan based its descriptions of the 6 recovery units on differences in genetics, morphology, behavior, ecology, and habitat use over the range of the Mojave population of the desert tortoise. The recovery plan contains generalized descriptions of the variations in habitat parameters of the recovery units and the behavior and ecology of the desert tortoises that reside in these areas (pages 20 to 22 in Service 1994a). The recovery plan also describes the characteristics of desert tortoises and variances in their habitat, foods, burrow sites, and phenotypes across the range of the listed taxon (pages 24 to 26 in Service 1994a). Consequently, to capture the full range of phenotypes, use of habitat, and range of behavior of the desert tortoise as a species, conservation of the species across its entire range is essential.

The Service released a draft revised recovery plan for public review in 2008 (Service 2008); the final revised plan is expected to be released later in 2011. The revised recovery plan refines the recovery and delisting criteria and includes a discussion of reducing the number of recovery units from six to five. Since 1994, research pertaining to both ecological and genetic variation has provided important insights into patterns of distribution within the Mojave desert tortoise population. This information was used to define the recovery unit boundaries in a manner that balances both distinctiveness and variability within the population. Maintaining local adaptation as well as genetic diversity over time is important for recovery; thus, applying these concepts at the appropriate recovery unit level will facilitate prioritization of recovery and management activities within the various geographic units. Based on this information, the Eastern Colorado and the Northern Colorado recovery units, and a portion of the Eastern Mojave Recovery Unit in Piute and Fenner valleys, were combined to form the Colorado Desert Recovery Unit in the revised recovery plan (Service 2008).

For this biological opinion, however, we use the 1994 recovery unit boundaries for three reasons: the Service has not formally adopted the revised recovery plan and revised recovery unit boundaries; existing data sets are specific to the units as delineated in the 1994 recovery plan; and the information relative to the environmental baseline and conservation targets for the Northern Colorado Recovery Unit can be applied to the analysis of the action area.

Distribution and Population Trends: Typical desert tortoise habitat in the Mojave Desert is characterized as creosote bush scrub below 1,676 m (5,500 ft) in which precipitation ranges from 5 cm to 20 cm (2 in to 8 in), where a diversity of perennial plants is relatively high, and production of annual plants is high. The Mojave population of the desert tortoise includes those

animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, southwestern Utah, and in the Sonoran (Colorado) Desert in California.

The best available information indicates the Mojave population of the desert tortoise is declining in abundance in most areas throughout its range. Line distance sampling is now being used as part of a long-term monitoring strategy to detect population trends. This program was put into place in 2001, but detecting population trends is expected to be a gradual process and surveys conducted over short periods of time (e.g., 2001 to 2007) would only reveal catastrophic declines or significant changes. However, these data do provide some information on variability in annual and regional densities between recovery units. In general, over the first 6 years of rangewide monitoring (2001-2005, 2007), tortoises were least abundant in the Northeast Mojave Desert Recovery Unit, the highest reported densities occurred in the Upper Virgin River Recovery Unit, and considerable decreases in density were reported in 2003 in the Eastern Colorado and Western Mojave Recovery Units (Service 2008). The proposed project occurs in the Eastern Colorado Recovery Unit per the species recovery plan (Service 1994a), which was merged with the Northern Colorado Desert Recovery Unit in the draft revised recovery plan (Service 2008) and referred to simply as the Colorado Desert Recovery Unit.

Current Threats: The majority of threats to desert tortoises and their habitats remain similar to those cited in the original listing rules and are generally associated with human land uses. Some of these threats include urbanization, unauthorized OHV activity, authorized vehicular activity, illegal collecting, mortality on paved roads, predation by common ravens and domestic and feral dogs, vandalism, livestock grazing, feral burros, drought, nonnative plants and changes to natural fire regimes, and environmental contaminants. In addition, upper respiratory tract disease and possibly other diseases were identified as significant threats and continue to be of concern.

Renewable Energy Projects in the BLM California Desert District

In an effort to meet the California Renewable Portfolio Standards (33 percent renewable energy by 2020) and national energy priorities, a large number of renewable energy projects have been proposed on BLM-managed land, State-owned land, and private land in California and throughout the West. As of January 2010, there were 244 proposed renewable energy projects in California in various stages of the environmental review process or under construction. As of December 2009, 49 of these projects, representing approximately 10,500 MW, intended to request American Recovery and Reinvestment Act funds from the Federal government. Solar, wind, and geothermal developers have requested ROW grants on approximately 404,685.64 ha (1 million ac) of BLM lands within the California deserts. State and private lands have also been targeted for renewable solar and wind projects (BLM 2011).

Reasonably foreseeable projects that could contribute to the baseline conditions in any given area within the range of the desert tortoise depend on the extent of resource effects, but may have implications on the recovery potential of the species should habitat fragmentation and habitat and population connectivity be severely compromised. Projects within the range of the Mojave population of the desert tortoise in the California Desert District of the BLM are illustrated in the

appendices identified as “Table 1B”, “Table 2”, “Table 3”, “Cumulative Impacts - Figure 1” and “Cumulative Impacts - Figure 2” from the DEIS/SA (CEC 2010a). Numerous renewable energy projects on BLM-managed lands and within desert tortoise habitats in Nevada and Arizona are currently approved or undergoing the environmental review process.

More than 20 renewable energy and transmission projects have been approved or are proposed within 32.2 km (20 mi) of the Rice Solar Energy Project. These range from 44 ac to 35,600 ac (140 ac to 35,600 ac) in size. Projects approved for construction include Devers-Palo Verde 2 (DPV2) Transmission Line Project, Colorado River Substation Expansion [17.8 ha (44 ac)], Desert Southwest Transmission Line, Blythe Energy Project II [12.1 ha (30 ac)], Blythe Solar Power Project [3,804.1 ha (9,400 ac)], Genesis Solar Energy Project [809.4 ha (2,000 ac)], Desert Sunlight Solar Farm Project [7,600 ha (19,000 ac)], Blythe Airport Solar I Project [259 ha (640 ac)], and the Wiley’s Well Communication Tower Project. Collectively, approved projects total more than 12,545.3 ha (31,000 ac), which contribute to the environmental baseline both within and outside of the action area analyzed under this biological opinion.

In addition, BLM has issued a draft programmatic solar energy development EIS (Solar PEIS) and CDCA plan amendment (BLM and DOE 2010). This effort identifies over 8.4 million ha (21 million ac) including 24 Solar Energy Zones (SEZ) constituting approximately 274,134.1 ha (677,400.0 ac) across six western states that would be available for solar energy development on BLM-managed lands (BLM and DOE 2010). The proposed action is located within the Riverside East SEZ [approximately 82,151.2 ha (203,000.0 ac)], which is one of four SEZs in southern California that total just under 161,874.3 ha (400,000.0 ac).

The project-by-project and cumulative effects of the renewable energy program within the range of the Mojave population of the desert tortoise have the potential to appreciably reduce the environmental baseline relative to the species’ conservation and recovery. The effects from utility-scale projects and impacts to habitat and population (i.e., genetic) connectivity have recently come to the forefront as a significant threat to the desert tortoise. The magnitude and duration of habitat loss that would result from construction and operation of the approved and proposed renewable energy projects in this region have the potential to constrict the remaining habitat linkages and limit gene flow between the Mojave and Sonoran deserts (see “Habitat and Population Connectivity” below).

ENVIRONMENTAL BASELINE

Regulations implementing the Act (50 CFR § 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed Federal projects in the action area that have undergone section 7 consultation, and the impacts of State and private actions which are contemporaneous with the consultation in progress.

As discussed in the "Action Area" section, the action area for this project includes: 1) the solar generating facility project site and associated components; 2) gen-tie and switchyard including a distance of up to 500 m (1,640 ft) on each side of centerline from linear facilities where any desert tortoises would be moved out of harm's way; 3) communications facilities; 4) proposed desert tortoise control and recipient sites, and all contiguous tortoise habitat within 6.5 km (4.0 mi) of the release point of translocated tortoises; and 5) lands acquired (or within the ownership parcel) to offset project impacts. The environmental baseline of each of these components of the 8,620.6 ha (21,302 ac) action area is described below.

Past Consultations in the Action Area

The Service has issued the following biological opinions for actions that have occurred or will occur within the action area for this consultation. In both cases, the Service determined that the proposed action was not likely to jeopardize the continued existence of the desert tortoise.

The Service issued a programmatic biological opinion evaluating the effects of BLM's CDCA plan amendment for the NECO Plan (BLM 2002) on desert tortoises in 2002 and as amended in 2005 and 2007. The programmatic biological opinion exempted take for casual uses (e.g., recreation, mining, OHV use), livestock grazing, and removal of burros that BLM authorizes through approval of the CDCA plan. Projects outside of these activity categories require separate consultation. Ongoing land uses covered under these previously issued biological opinions have allowed for additional habitat degradation in the Rice project area, primarily along the gen-tie line, due to factors such as introduction and spread of nonnative plant species and predators associated with disturbed habitats. The sheep grazing allotment that surrounds the ownership parcel where the Rice Solar Energy Project is proposed is also addressed in this CDCA biological opinion.

The sheep grazing allotment is referred to as the Rice Valley Allotment, and is classified as ephemeral, meaning the primary forage for livestock is largely comprised of annual plant species. The production of annual forage can vary greatly from year to year, depending on many factors such as the amount and timing of rainfall, temperatures, and wind conditions. After the desert tortoise was listed under the Act, the BLM altered the management of domestic sheep to promote the conservation of desert bighorn and desert tortoise. As a result, approximately 3,642.2 ha (9,000 ac) in the western portion of the 34,626.9 ha (85,565 ac) allotment, which supports low densities of desert tortoises, was removed from this land use. Because of these low densities, the Service determined that no more than one desert tortoise is likely to be killed or injured as a result of sheep grazing within this allotment during any given grazing season when the allotment is in use.

The Service issued a biological opinion for effects to desert tortoises from minor construction activities within the BLM's California Desert District in 1997. For the purposes of the biological opinion, minor construction activities constitute less the 0.8 ha (2 ac), cannot exceed 4.1 ha (10 ac) of impacts to designated critical habitat in any one year, and cannot exceed 16.2 ha (40 ac) within the Northern Colorado Recovery Unit over the life of the opinion. Once these thresholds

have been met, the BLM must reinitiate consultation. A variety of activities were addressed under this biological opinion, including construction of communications facilities, location of temporary helicopter staging sites, construction of guzzlers or spring development for wildlife, or location of apiary sites. Disturbance from these actions and other minor construction activities could require cross-country travel by vehicles, construction of access roads or fencing, and staging areas for construction equipment. The biological opinion exempts take, in the form of direct mortality or injury, of up to 2 desert tortoises per year from construction activities, and take, in the form or harassment, of up to 10 desert tortoises per year for the purposes of moving individuals out of harm's way. Conservation measures are included as part of the proposed action to avoid, minimize, and offset adverse effects to the species.

In sum, the biological opinions listed above have authorized a relatively small amount of take within the large areas that they cover. Because the action areas defined for these projects narrowly intersect that which was analyzed for the project, only a relatively small portion of the total take associated with these projects would coincide geographically with the project. Consequently, we conclude that take associated with these projects has not substantially affected the environmental baseline within the action area of the proposed action.

Habitat Characteristics of the Action Area

The project area is in the Northern Colorado Desert Recovery Unit (Service 1994a) and within the planning area for BLM's NECO Plan (BLM 2002). Eleven designated wilderness areas occur within 80.5 km (50.0 mi) of the project site, while Joshua Tree National Park is 96.6 km (60.0 mi) to the southwest of the project site and the Chemehuevi CHU/DWMA is within 10.0 km (6.2 mi) of the project boundary. In addition, BLM-designated WHMAs for bighorn sheep occur in the immediate vicinity of the project site and the project itself lies within a WHMA established to maintain wildlife and habitat connectivity between the Chemehuevi CHU/DWMA and Turtle Mountains Wilderness to the north and Palen-McCoy and Rice Valley wilderness areas to the south (BLM 2002). The wilderness areas most proximate to the project include the Turtle Mountains [4.8 km (3.0 mi)] to the north, Rice Valley [9.7 km (6.0 mi)] to the south, Palen/McCoy [12.9 km (8.0 mi)] to the southwest, and the Big Maria Mountains and Riverside Mountains [19.3 km (12.0 mi)] to the southeast.

The Rice Valley is a dry shallow basin with a north-south orientation, bounded by the Turtle Mountains to the north and the Big Maria Mountains to the south. The edges of the valley are more weakly defined to the west by the Arica Mountains and to the east by the West Riverside Mountains. The valley is dominated by creosote bush (*Larrea tridentata*) interrupted by portions of a large sand sheet that stretches from Cadiz to Ward Valley. The rugged mountain areas, lowland valleys, and dunes provide a diversity of topographical features that are habitat for a variety of plant and animal species. The lack of California Natural Diversity Database (CNDDB) records for the area, particularly for the desert tortoise, is likely due to lack of surveys (Western 2011a, CEC 2010a).

Although the project site is within the West Basin of the Colorado River, which drains into the Salton Sea Trough, Rice Valley is a sink with no broader hydrological connectivity. Rice Valley

is part of a small watershed and lacks any major washes. Although it is a sink, no perennial surface water sources and evidence that a lake ever formed in the valley during wetter climatic periods exists (Western 2011a, CEC 2010a).

Developed uses in the project vicinity include SR 62, which runs in an east-west direction immediately north of the project site, the Arizona-California Railroad, which is just to the north of SR 62 and the Colorado River Aqueduct, and is immediately north of the railroad. Large berms catch runoff from the Turtle Mountains, which are located immediately north of the aqueduct, and funnel this water to crossings over the aqueduct, under the railroad, and over SR 62. In the immediate project area, just north of the project site, two crossings for stormwater runoff serve as wildlife movement corridors (Western 2011a, CEC 2010a).

The project site was used during World War II as the Rice Army Airfield, a part of the U.S. Army's Desert Training Center/California-Arizona Maneuver Area (DTC/CAMA) (Western 2011a, CEC 2010a). The Rice Army Airfield and adjacent Camp Rice were part of a three-state ad hoc training environment established to acclimatize troops to desert warfare between 1942 and 1944 and involved infantry, artillery, and air support forces. The DTC/CAMA consisted of more than 14 widely separate encampments or bivouac facilities and large maneuver and training areas surrounding the camps. After World War II, the military disposed of the airfield, transferred it to the county and later sold it into private ownership. Rice Airfield was operated privately until it was abandoned between 1954 and 1958 (Freeman 2009).

The abandoned airfield once consisted of two paved 1,524-m (5,000-ft) long runways and numerous dispersal pads or hardstands extending beyond the runways to the south, and concrete foundations for some buildings. Various dirt roads, concrete pads, and portions of the old runways were observed during surveys of the project site (Western 2011a, CEC 2010a).

Since the time the airfield was abandoned, the project area has been recolonized by predominately native annual and perennial species. Previously paved areas, such as the runways, taxiways, and aircraft hardstands, have been recolonized by creosote bush and white bursage (*Ambrosia dumosa*), but have a lower density of creosote bush shrubs than surrounding areas. Because of this lower shrub density, these areas are clearly visible on aerial photographs despite recolonization by native species (Western 2011a, CEC 2010a).

The area to the south and downslope of the project site is a sand dune area known as Rice Valley Dunes. This area was formerly designated by the BLM as an OHV area, but the designation was removed by the BLM for lack of use (Western 2011a, CEC 2010a). This area provides habitat for the Mojave fringe-toed lizard (*Uma scoparia*).

The existing Black Point Communication Site is located atop a low mountain that is mostly exposed rock or desert pavement with little perennial vegetation (Western 2011b). Some of the side slopes support creosote bush and white bursage. The passive reflector site is located within a disturbed landscape characterized by agricultural development including clearing and leveling for irrigated fields, irrigation canals, earthen berms, and access roads. Typical vegetation outside

of the agricultural fields is honey mesquite (*Prosopis glandulosa*) or screwbean mesquite (*Prosopis pubescens*), arroweed (*Pluchea sericea*), tamarisk (*Tamarix aphylla*), and quailbush (*Atriplex lentiformis*).

While the existing land uses described above, such as sheep grazing and construction and use of roads and routes, have likely contributed to changes in vegetation composition through the establishment and spread of invasive nonnative plant species, the general area surrounding the project is largely undeveloped and supports intact habitats. Thus, overall, the action area for the project is not affected by extensive habitat destruction or degradation.

Status of the Species in the Action Area

Project Area

A lack of survey and/or monitoring data exist for the desert tortoise in the Rice Valley due to a previous lack of development pressure since the species' listing and the dedication of limited resources to the nearby DWMAs (Western 2011a, CEC 2010a). Although the Chemehuevi CHU/DWMA is within 10.0 km (6.2 mi) of the project site and immediately adjacent to Rice Valley, the closest CNDDB record for desert tortoises is approximately 7.6 km (4.7 mi) to the east in Vidal Valley (BLM 1986 in Western 2011a). According to the CNDDB record, the densities in that area are between 8 and 19 tortoises/km^2 (20 and 50 tortoises/mi^2) (BLM 1986). The valley contains suitable habitat that provides connectivity to well-documented and monitored occupied habitat north, east, and west of the project site. Specifically, there is lowland habitat connectivity between Rice and Vidal valleys, south of SR 62, on the north and south ends of the 7.2-km (4.5-mi) long West Riverside Mountains. The distribution map in Bury *et al*. (1994) does not include the Rice Valley (Service 2008); however the recent U.S. Geological Survey (USGS) desert tortoise habitat model (see discussion below) identifies the project area as potential habitat, but little else within the Rice Valley is depicted as suitable (Nussear *et. al.* 2009).

The project is located on lands categorized as Moderate Multiple-use Class (MUC-M) designation (Appendix A in BLM 2002). Desert tortoise habitat in MUC-M was excluded from designated DWMAs based on the assumption that these areas generally supported low to medium tortoise densities, though survey data were unavailable for most areas. Since the NECO Plan was approved, considerably more data have been obtained relative to desert tortoise population genetics, importance of habitat and genetic connectivity, species occurrence and densities within the Colorado Desert, and threats to the species throughout its range (Service 2008), including the extent of renewable energy development proposed in the plan area.

The Colorado River Aqueduct, railroad, and SR 62 are assembled parallel to one another, running roughly east-west across the northern end of Rice Valley in a corridor that is about 0.40 km (0.25 mi) wide. Individually each of these features is a significant barrier to north-south desert tortoise movement; in combination, they are a formidable obstacle to habitat and population connectivity (CEC 2010a). On the north side of the aqueduct, ditches were

constructed to funnel runoff from the Turtle Mountains into a series of widely spaced overpasses. The concentrated drainage passes under the railroad in box culverts or at locations where the railroad is elevated on small bridge trestles and then flows over SR 62. Habitat connectivity north and south of the aqueduct is limited to overpasses. Box culverts or trestles provide "safe" passage across the railroad, but no crossings are along SR 62. Only 14 crossings occur within the 19.3 km (12.0 mi) corridor through the Rice Valley; two of the crossings through these linear barriers exit directly into the northern portion of the project site (Western 2011a). The largest aqueduct crossing is approximately 519.7 m (1,705 ft) wide and is north of the western margin of the project site. A similar, but narrower, crossing is present north of the eastern margin of the project site (CEC 2010a).

Downstream from each aqueduct siphon, each wash is crossed by the railroad line, which is built on concrete supports and foundations bridging the washes. The railroad crossings north of the project site are approximately 13.7 m (45 ft) wide, with about 1.8 m (6 ft) of vertical clearance. East and west of the channel crossing, the railbed is elevated a few feet above grade, which provides opportunities for desert tortoises to pass beneath the railroad bridges (CEC 2010a).

Downstream from the railroad bridges, SR 62 crosses each wash at grade (i.e., no bridges or culverts provide safe passage across the highway). Because of this, slower-moving animals, particularly desert tortoises, would be at high risk of injury while crossing the highway (CEC 2010a).

Other effects to desert tortoises in the project area may include road kill along SR 62 as well as along the dirt roads extending from SR 62 to nearby wilderness areas, and some OHV use. Trespass may be relatively common on the privately owned former Rice Army Airfield site because of a small network of roads on site. The surrounding area is comprised largely of BLM-managed lands that are accessible by a network of existing routes (Western 2011a). A 32,375 ha (80,000.0 ac) sheep grazing allotment surrounds the project site that is grazed on average about one to two times every 10 years. Approximately 2,000 sheep are moved through the allotment in bands to avoid use of any given area for more than a few days at a time (M. Massar, BLM, pers. comm. 2011).

As stated above, USGS developed a quantitative habitat model for the range of the Mojave population of desert tortoise, which includes portions of the Sonoran Desert in California (Nussear *et al.* 2009). The model provides a measure of the statistical probability of desert tortoise occurrence and a geospatial depiction of potential desert tortoise habitat. To date, the USGS model is viewed as the best available data for predicting desert tortoise occurrence; however, it does not account for anthropogenic changes that have occurred across the landscape over time and associated reduction or elimination of habitat potential. In addition, monitoring efforts and collection of presence data have mainly been focused within CHUs, DWMAs, and other lands allocated for conservation; therefore, the lack of presence data in the interstitial spaces between conservation lands does not necessarily indicate no or low predicted habitat. Thus, the Rice Valley is likely to support at least low densities of desert tortoise except within the shallow dunes at the southern edge of valley.

Desert tortoise surveys were conducted during April and May 2009, which covered 1,036 ha (2,560 ac) for the project site, 16 km (10 mi) for gen-tie alignment, and zone-of-influence transects (ZOI) (CH2M HILL 2009). A total of 7 desert tortoises, 91 shell-skeletal remains, 66 potential burrows, 56 scat "events", and 3 egg shell fragment locations were observed. The majority of the observations were concentrated in the northwestern portion of the project site and the southern end of the gen-tie alignment. On the project site, observations included 1 live desert tortoise, 16 carcasses, 7 burrows, 13 scat events, and 2 shell fragment locations. One live desert tortoise was observed along the gen-tie alignment.

ZOI surveys were conducted at 100; 300; 600; 1,200; and 2,400-ft intervals in suitable desert tortoise habitat along all sides of the project site and along the gen-tie alignment. Additionally, ZOI surveys were conducted at 0.75 and 1.0-mi intervals from the boundary of the project site. Six live desert tortoises were observed within the project site ZOI and two were observed within the gen-tie ZOI. Total sign observed during ZOI surveys included 66 shell-skeletal remains, 52 burrows, 35 scat events, and 1 egg shell fragment location (CH2M HILL 2009).

Although only seven live desert tortoises were observed during the surveys, suitable habitat was documented throughout the project areas. Numerous desert tortoise carcasses (91) were distributed relatively evenly throughout the survey area including along the gen-tie alignment. This may suggest that desert tortoises in the Rice Valley were subject to and continue to experience pressure from drought, disease, and/or some combination of threats. Eggshell fragments located on the eastern edge of the project site confirmed that breeding is occurring locally, and difficult-to-detect juveniles and hatchlings are likely to occur within the project area (CH2M HILL 2009).

Pre-project surveys represent single points in time; desert tortoises that occur on site may have remained undetected, and individuals may have moved on to the site from surrounding areas after surveys were conducted, especially from the higher density habitats north of the project area. As a result, we anticipate that more desert tortoises may occur within the project sites and that the actual number of desert tortoises present is expected to fall within the range calculated based on the 95 percent confidence interval of the estimate (Table 3). We acknowledge that this method may overestimate desert tortoise densities and abundance. However, we determined that applying an estimate based on the 95 percent confidence interval would provide a biologically conservative approach using the best available data to establish a baseline for analyzing the potential impacts of the project.

Based on the estimates reflected in Table 3, up to 10 subadult and adult desert tortoises may occur on the site for the solar energy generating facility. In addition to subadult and adult desert tortoises, the project area likely supports juvenile desert tortoises and eggs. Estimating densities of juvenile desert tortoises is difficult because of low detection probabilities due to their small size and cryptic nature. However, based on a 4-year study of their population ecology, Turner *et al*. (1987) determined that juveniles [i.e., individuals <159 mm (6.3 in)] accounted for between 19 and 81 percent of the overall population. Using this range and the estimated maximum of 10 subadult and adult tortoises within the project site, we estimate that between 2 and 8 juvenile

desert tortoises may occur on the site for the solar energy generating facility. We recognize that the survey data used for this estimate come from a limited number of studies and that population levels are constantly changing. We also recognize that since our estimate of the number of subadult and adult tortoises in the project area may be an overestimate (as discussed above), the estimate of the number of juveniles may be an overestimate as well, but provides the best available data to establish a baseline for analysis.

Table 3. Estimated desert tortoise abundance and density for the solar generating facility and gen-tie

Component Estimate	Project site (4 mi^2)	Gen-tie (south)	Gen-tie (north)	Gen-tie (total)
Live observations	1	-	-	3
Estimated abundance (n)*	1.8	1.7	0	1.7
Lower 95% CI**	0.33	0.32	0	0.32
Upper 95% CI	9.70	9.43	0	9.35
Estimated density per km^2	0.45	9.18	0	2.44

*n=estimated number of subadult and adult desert tortoises present
**CI=confidence interval

In addition, we expect the project area to support desert tortoise eggs. Estimating the number of tortoise eggs is extremely difficult given that the eggs are buried beneath the soil surface. To estimate the number of eggs that could be present on site, we used the mean clutch size of 5.38 eggs per clutch (Turner *et al.* 1986 in Service 1994a) and a mean number of clutches of 1.6 per female per year (Turner *et al.* 1984). Assuming a 1:1 sex ratio (Turner *et al.* 1984, Turner *et al.* 1987), 5 of the estimated 10 desert tortoises within the project site may be reproductive females that together could produce approximately 43 eggs per year. Applying these assumptions [i.e., the sex ratio, mean clutch size, and mean number of clutches per female per year are comparable to those observed by Turner *et al.* (1984)] to estimate the number of eggs on the project site has an unknown but high level of uncertainty. Therefore, while we cannot calculate a precise estimate for the number of eggs that may be impacted by the project, we use this estimate, which constitutes the best available information, for the analysis contained in this biological opinion.

Three live desert tortoises were recorded along the gen-tie alignment during pre-project surveys; as many as nine subadult and adult desert tortoises were estimated to occur along this project component. However, because of the linear nature of this project component and the survey methodology employed (i.e., ZOI), this estimate is likely imprecise and, therefore, estimates were not calculated for juvenile desert tortoises or eggs for the gen-tie (CH2M HILL 2009). Because of the low densities expected in the action area, we anticipate that few desert tortoises would be encountered during construction and O&M activities along the gen-tie, and all of the individuals encountered would be moved out of harm's way in accordance with the most recent Service guidance or a Service-approved translocation plan.

Despite the patchy distribution of desert tortoise sign within the project study areas and areas of low predicted habitat, any portion of the project ROW may be important for connectivity between and dispersal from surrounding habitats. Desert tortoises are known to use lower-

quality intermountain habitat as dispersal routes, providing passage between high-quality habitat areas in the surrounding areas (Averill-Murray and Averill-Murray 2005). Historically, desert tortoise populations in the Sonoran Desert have exchanged individuals at a rate of one migrant per generation (Averill-Murray and Averill-Murray 2005).

Proposed Recipient (Translocation) Site

As detailed in the Service's most recent translocation guidance (currently Service 2010a), recipient sites must be sufficiently large to accommodate resident (if present) and translocated desert tortoises; the maximum allowable final density at recipient sites after translocation (includes residents and translocated tortoises) must not exceed 130 percent of the mean density detected in the nearest recovery unit [4.6 tortoises/km^2 (12 tortoises/mi^2) in the Northern Colorado Recovery Unit (Service 2009b)]; and the recipient site should exhibit disease prevalence of less than 5 percent. Because of the potential number of desert tortoises that may require translocation and other concerns related to disease and carrying capacity, the Service recommends that at least two recipient sites be identified and analyzed.

As described in the Service's translocation guidance (Service 2010a), if five or more desert tortoises would be translocated from the project site, the applicant would also monitor an equivalent number of resident desert tortoises at the recipient and a control site for a minimum of 5 years. The applicant would attach transmitters to all translocated individuals (along with resident and control animals, if necessary) prior to their release at the recipient site, and monitor all transmittered desert tortoises commencing on the date of release of the last translocated individual.

The proposed recipient site surrounds the site for the solar energy generating facility and includes the remaining 465.4 ha (1,150 ac) of the ownership parcel that would not be affected by project activities (CH2M HILL 2010). The remainder of the recipient site would include adjacent BLM-managed lands. The site would encompass the locations where desert tortoises translocated from the project site, including the perimeter fence alignment, would be released (referred to as "release points") and the area to which translocated desert tortoises may disperse after translocation. The recipient site also represents the area in which health assessments would be conducted on resident tortoises to ensure that disease prevalence within the resident population is less than 5 percent. For the purposes of this analysis, the proposed recipient site is generally equal to an area with a 6.5 km (4 mi) radius or roughly 132.7 km^2 (51.2 mi^2 or 32,782.2 ac).

Because few individuals are expected to be translocated from the project site thereby alleviating concerns about potential density-dependent effects, protocol-level desert tortoise surveys were not conducted on the proposed recipient site, although portions of it were included incidentally to the ZOI surveys performed for the project site. Based on the USGS habitat model that identifies this area as moderate to high-predicted habitat and the sign observed during the project-specific surveys, this area is expected to support a resident population of desert tortoises. To estimate desert tortoise abundance at this site for the purposes of this biological opinion, we used the

density estimate calculated for the Chemehuevi CHU/DWMA based on the line-distance sampling data collected as part of the Service's long-term monitoring program (Service 2009b). Based on the density estimate of 4.6 tortoises/km^2 (1.8 tortoises/mi^2), approximately 610 subadult and adult resident desert tortoises may be present on the approximately 132.7 km^2 (51.2 mi^2) proposed recipient site. Using the method described above to estimate juveniles and eggs, between 116 and 494 juveniles may be on site and reproductive females may produce as many as 2,626 eggs per year.

The Atchison Topeka Santa Fe Railroad that follows the Rice Valley Road alignment delineates the western boundary of the proposed recipient site. No ROW or utility corridors occur within the site, though future demand may increase as more renewable energy projects are proposed or come online. Several BLM-designated open routes of travel occur in this area, but desert tortoises would be released at sufficient distances from these routes to minimize the likelihood of vehicle and human access related sources of mortality. The exact location of release points would be identified in the final translocation plan. This area historically has received lower levels of recreational use, and such use is not anticipated to increase substantially in the future. In addition, the proposed recipient site is proximate to three wilderness areas, and none of the site is within a BLM-proposed solar energy zone pursuant to the Solar PEIS (BLM and DOE 2010).

The proposed recipient site does intersect the Rice Valley sheep grazing allotment that is used one to two times every 10 years. However, because the number of desert tortoises expected to be translocated is fewer than five (CH2M HILL 2010) and the tortoises in this area have been subject to this land use for decades, keeping the translocated individuals within their home ranges was prioritized over the potential conflicts with the land use in the selection of this site.

Proposed Control Site

To provide "control" baseline data from which to compare the effectiveness of translocation as a project minimization measure, a control population would also be monitored if greater than five desert tortoises would be translocated from the proposed project site. As detailed in the Service's translocation guidance (Service 2010a), control sites should be similar in habitat type/ quality and desert tortoise population size/structure as the recipient site and isolated from or a minimum distance of 10 km (6 mi) from the recipient site to preclude interaction between the resident and translocated desert tortoises and individuals used as controls. In addition, control sites should not support any translocated desert tortoises and will be used to monitor resident tortoises only; no tortoises from the project areas will be translocated to the control sites. The total number of control animals would be equal to the number of individuals translocated from the project site and the number of resident desert tortoises monitored at the recipient site. The exact location of a proposed control site would be identified in the final translocation plan should one be necessary and may coincide with a control site selected and analyzed for the Palen Solar Energy Project in the adjacent McCoy Valley (Service 2011).

Offsite Land Acquisition

As described in the "Action Area" section and CEC condition of certification BIO-16 (Western 2011a, CEC 2010b), land acquisition is proposed to offset the permanent loss of desert tortoise habitat; the applicant would provide compensatory mitigation at the ratios and for the acreages identified in Table 4. All or a portion of the acquired land may consist of lands held by the applicant, pending analysis of its suitability (see CEC 2010b for Selection Criteria). In addition, the applicant would provide funding for initial improvement and long-term maintenance, enhancement, and management of the compensation lands for protection and enhancement of desert tortoise populations, and comply with other related requirements of this condition of certification (BIO-16) (CEC 2010b, Western 2011a).

Based on the line-distance sampling data collected as part of the Service's long-term monitoring program for the Chemehuevi CHU/DWMA (Service 2009b), the abundance of the desert tortoise population within the compensation lands is estimated to be 28 tortoises/km^2 (73 tortoises/mi^2). However, because of the proximity of the ownership parcel to SR 62, desert tortoise densities are likely to be lower in this area. These lands will be managed in perpetuity for desert tortoise conservation and recovery.

Table 4. Compensation ratios and acreages for impacts from the project

Project component	Ratio/Calculation	Acres
Heliostat field, access roads, 9 gen-tie towers within ownership parcel	1:1 ratio	1,411.5
Switchyard, pull sites, 81 gen-tie towers on BLM-managed land	3:1 ratio	110.7
Total Compensation Requirement		**1,522.2**
Acreage Available		
Ownership parcel acres minus compensation required	3,325 ac – 1,522.2 ac	1,876.6
Fence buffer deduction*	-154.48 ac x 0.5	-77.2
Northern buffer deduction*	-217.28 ac x 0.5	-108.6
Total Ownership Parcel Acreage Available		**1,690.7**
Acres Surplus to Requirement	1,690.7 ac – 1,522.3 ac	**168.5**

*Area within 76.2 m (250 ft) of and between the perimeter security fence and SR 62 is considered to have half the habitat value of the standard acres because of proximity to the fence and SR 62 and potential edge/road effects; therefore, half of this acreage is deducted from the total available acres.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat that would be added to the environmental baseline, along with the effects of other activities that are interrelated or interdependent with that action. Interrelated actions are those

that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. Indirect effects can be both spatial and temporal in nature. In contrast to direct effects, indirect effects can often be more subtle, and may affect species and habitat quality over an extended period, long after project activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise, because project-related effects may not become evident in individuals or populations until years later.

In the "Environmental Baseline" section of this biological opinion, we derived estimates of the numbers of subadult, adult, and juvenile desert tortoises and eggs that are likely to occur within the action area from pre-project survey data, published literature, and long-term monitoring reports prepared by the Service. Because these sources constitute the best available information, we have used the estimates for the following analyses. We acknowledge, however, that not all individuals killed or injured during construction, operations, and maintenance activities will be detected by biological monitors or project staff and subsequently reported to us. The inability to detect all killed or injured individuals is largely due to the cryptic nature of desert tortoises, and their fossorial habits and limited abundance; and, in the case of juveniles and eggs, their small size and location underground reduce detection probabilities of these life stages. Another confounding factor is that scavengers may locate carcasses before monitors and either remove them from the site or dismember them to the extent that the cause of death cannot be determined.

Direct Effects

Construction and O&M

Death and injury of desert tortoises could result from construction activities on the project sites such as clearing and grubbing of vegetation; trenching activities and entrapment in open trenches and pipes; and collisions with or crushing by vehicles or heavy equipment, including crushing of individuals that take shelter under parked vehicles and are killed or injured when the vehicle is moved. Mortality mechanisms could also include individual desert tortoises or their eggs being crushed or buried in burrows during construction and O&M-related activities. Because of increased human presence in the area, desert tortoises may be killed or injured due to collection or vandalism associated with increased encounters with workers, visitors, and unauthorized pets. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of death or injury.

To minimize the death and injury of desert tortoises residing in or entering the construction or O&M disturbance areas (e.g., project sites, linear facilities, access roads), the applicant would implement the general and species-specific conservation measures specified above in the "Conservation Measures" section of the "Description of the Proposed Action". Some of the measures include, but are not limited to, delineating all areas to be disturbed (including new and existing roads and turn-around areas) with stakes or flagging and using previously disturbed

areas as staging and material sites whenever possible; minimizing traffic impacts by prohibiting cross country vehicle traffic and enforcing a 32 kph (20 mph) (or less) speed limit on all roads used during construction; and having Authorized Biologists or Biological Monitors present during all ground disturbing construction activities that have the potential to disturb soil, vegetation, and wildlife (BIO-8). The Authorized Biologist must meet the Service's Authorized Biologist qualifications and be approved by the Service, BLM, and CDFG prior to the initiation of ground-disturbing construction activities (BIO-1 through BIO-5).

Prior to construction, the project site and switchyard site would be permanently fenced with desert tortoise exclusion fencing. Each site would be cleared of all desert tortoises located prior to any ground disturbance. Fencing installed to exclude desert tortoises from the work areas, over time may fail or be breached, allowing individuals to pass through the barrier and be impacted by project-related activities. Temporary fencing left in place following project activities in the area may also contribute to habitat fragmentation. Materials and equipment left behind following construction may entrap or entangle desert tortoises, attract desert tortoise predators, or provide shelter for tortoises, which when removed may result in displacement or injury of individuals. The impact avoidance and minimization measures contained in BIO-8 would reduce the potential for these impacts, particularly delineation and clearance of all construction areas and requiring that Authorized Biologists or Biological Monitors be present during all ground disturbing activities. During construction of the permanent and/or temporary exclusion fencing, any desert tortoises located during the surveys would be either moved out of harm's way or translocated to the approved recipient site and any individuals located in burrows would be treated as outlined in the Service-approved translocation plan (BIO-14 and BIO-15).

Any desert tortoises undetected during the initial clearance surveys may be located during construction activities by routine site inspections by the Authorized Biologist or incidental observations by construction workers. The WEAP would be administered to all onsite personnel and be repeated annually for all permanent personnel and within a week of arrival to any new construction personnel (BIO-6). This training would enhance the effectiveness of onsite personnel to detect and avoid desert tortoises, and ensure proper translocation procedures are adhered to during construction and O&M activities.

Some additional measures to avoid and minimize death and injury of desert tortoises include covering or backfilling trenches, storing construction materials and piping inside the perimeter security fence, and minimizing the amount of water used for dust abatement to avoid ponding, which acts as an attractant to desert tortoises and their predators (BIO-8).

Overall, we expect death and injury of most subadult and adult tortoises to be avoided during construction and O&M activities through implementation and compliance with the conservation measures, including translocation, in the "Conservation Measures" section above, and in detail in the commission decision (CEC 2010b). However, because juvenile desert tortoises and eggs are difficult to detect, surveyors may overlook most of them during clearance surveys and construction monitoring, leaving these life stages susceptible to death and injury. Based on the calculations performed for the "Environmental Baseline" section, we estimate that as many as

two to eight juvenile desert tortoises may occur within the project site. No estimates were calculated for the switchyard or gen-tie alignment.

We also estimate that reproductive females on the project site may produce as many as 43 eggs per year. Because the estimate for the number of eggs is for total annual production, we cannot predict what portion of this total will be present on site during construction activities for any given phase and, as a result, we cannot estimate how many eggs would be destroyed by construction and O&M activities.

Based on: 1) the estimated number of subadult, adult, juvenile, and desert tortoise eggs expected to occur within the action area; 2) understanding that early life stages naturally suffer higher mortality rates and are not as demographically/ecologically important as reproducing adults in long-lived species, such as desert tortoises, which reproduce many times over their reproductive lives [i.e., r/K selection theory in MacArthur and Wilson (1967)]; and 3) the conservation measures that have been identified for each project component, we conclude that death and injury resulting from construction and O&M of the proposed action over the life of the project will not appreciably reduce the desert tortoise population or reproductive success within the Northern Colorado Recovery Unit. As previously mentioned, because the specifics relative to decommissioning would not be described until the project has reached the end of its permit term, no effects from decommissioning are addressed in this biological opinion. Thus, no take, in any form, of desert tortoises is exempted herein for decommissioning.

Desert Tortoise Translocation

In addition to construction and O&M-related activities, the primary effects of the proposed action on desert tortoises will result from capture and translocation of individuals prior to any ground disturbance associated with the project. Capture and translocation of desert tortoises may result in accidental death and injury from stress or disease transmission associated with handling tortoises; stress associated with moving individuals outside of their established home range; stress associated with artificially increasing the density of tortoises in an area and thereby increasing competition for resources; and disease transmission between and among translocated and resident desert tortoises. Capture and handling of translocated and resident (if necessary) desert tortoises for the purposes of conducting health assessments, which include visual inspection relative to body condition, clinical signs of disease, and collection of biological samples for disease screening (i.e., blood samples to test for antibodies to pathogens that cause upper respiratory tract disease or ELISA), could also result in accidental death or injury.

Capturing, handling, and moving tortoises for the purposes of translocating them out of the project areas or out of harm's way may result in accidental death or injury if these methods are performed improperly, such as during extreme temperatures, or if individuals void their bladders and are not rehydrated. Averill-Murray (2002) determined desert tortoises that voided their bladders during handling had lower overall survival rates (0.81 to 0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures and procedures, such as reused latex gloves, pathogens may be spread

among individuals. To address these potential effects, the applicant's translocation plan has been drafted in accordance with the most recent Service guidance (Service 2010a), though implementation will continue to be adaptively managed over time to facilitate a successful translocation effort.

We anticipate that the applicant will capture and translocate all subadult and adult desert tortoises from the fenced project areas and any portion of the action area where individuals may be in harm's way of project activities. Desert tortoises located on the project site and perimeter fence line are likely to be moved more than 500 m (1,640 ft) outside of their existing home ranges to the adjacent recipient site. Based on the survey results for the project and densities for the Northern Colorado Recovery Unit, we estimate that up to 10 subadult and adult desert tortoises would be translocated; we have estimated that the project site may support between 2 to 8 juvenile desert tortoises and reproductive females may produce as many as 43 eggs per year. However, we acknowledge that this may be an overestimate given one live desert tortoise was observed on the project site.

Translocation has the potential to increase the prevalence of diseases, such as upper respiratory tract disease, in a resident population. Physiological stresses associated with handling and movement or from density-dependent effects could exacerbate this risk if translocated individuals with subclinical upper respiratory tract disease or other diseases present symptoms subsequent to translocation. This potential conversion of translocated desert tortoises from a non-contagious to contagious state may increase the potential for infection in the resident population above pre-translocation levels. To minimize this risk, health assessments would be conducted on all desert tortoises to be translocated (i.e., up to 10 from the project site) prior to being released in accordance with the most recent Service guidance.

Translocated desert tortoises will not be released into the recipient sites until results of the disease tests have been received and the Service approves the disposition plan for each individual. While awaiting test results, desert tortoises will be monitored *in-situ* or penned (i.e., quarantined) on site. Handling and blood collection may result in elevated stress levels that render individuals more susceptible to disease or dehydration from loss of fluids. Because the applicant will employ experienced biologists, approved by the Service, BLM, and CDFG, and sanctioned handling techniques to perform health assessments and collection of biological samples, we do not expect these activities to result in death or injury of any individuals. Furthermore, required disease screening and quarantine procedures will reduce the potential for introduction and spread of disease due to translocation.

Desert tortoises will be monitored *in-situ* or quarantine pens will be used to hold individuals located above ground during clearance surveys, individuals that may emerge from hibernation during the winter, and while awaiting disease screening results. The applicant will construct the quarantine pens and follow husbandry procedures in accordance with the most recent Service guidance. The pens will be 20 m × 20 m (65.6 ft × 65.6 ft) and a veterinarian-approved husbandry plan will direct care of desert tortoises while in quarantine. Maintaining desert tortoises in quarantine pens could increase their vulnerability to exposure, stress, dehydration,

inadequate food resources, and increased predation. However, because desert tortoises will be monitored regularly, care will be administered following specific procedures, and the quarantine period will not exceed 18 months, we anticipate that quarantined individuals are unlikely to experience death or injury from the vulnerabilities identified above. The potential exists, however, for predators or poachers to target quarantined desert tortoises. This risk is also expected to be eliminated through regularly scheduled monitoring in accordance with the translocation plan. Desert tortoises monitored *in-situ* may be subject to similar effects as those in quarantine pens; however, because these individuals will be confined to large areas within their existing home ranges, we anticipate that the potential for increased stressors would be relatively low and adequate shelter and food resources would be accessible until translocation.

Prior to translocation of desert tortoises from the project site, surveys of the recipient and control sites will be conducted to confirm densities, perform health assessments on all desert tortoises encountered, and attach transmitters for monitoring purposes, if necessary. The number of desert tortoises at the recipient and control sites should be equal to the number of individuals expected to be translocated from the project sites. If fewer than five desert tortoises will be translocated, no control site or control animals are required and health assessments would not include collection of biological samples. In addition, disease prevalence at the recipient sites should not exceed 5 percent within the resident population (Service 2010a). Therefore, the prevalence and distribution of disease within the recipient site will dictate the number of desert tortoises that can be translocated to the site.

The minimum sample size needed to detect less than 5 percent disease prevalence at the 95 percent confidence level depends upon the estimated abundance at the site. Based on the estimate of 610 resident desert tortoises at the proposed recipient site, blood collection would be required for a minimum of 48 individuals to establish the disease prevalence baseline of less than 5 percent with 95 percent confidence for the site (Averill-Murray 2010). If results demonstrate that the baseline disease prevalence at the propose recipient site exceeds 5 percent, an alternative site must be selected.

Because the estimated number of desert tortoises expected to be moved (i.e., one) is less than five, only the translocated individual would be monitored at the proposed recipient site, pending health assessment results. Therefore, affixing transmitters and conducting health assessments on resident and control desert tortoises would not be required.

While we cannot reasonably predict if an increase in disease prevalence within the resident population may occur due to translocation, our analysis considers the following avoidance and minimization measures and other factors that are likely to reduce the magnitude of this risk:

1. The applicant would use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals;

2. If the proposed recipient site is used, desert tortoises in the project area are part of a continuous population with the resident populations of the recipient site and are likely to share similar pathogens and immunities;

3. Translocated desert tortoises from the project site would be moved a relatively short distance, which is likely to reduce post-translocation stress associated with long-distance translocations;

4. Density-dependent stresses are unlikely to be present for reasons stated below;

5. Any animal that has clinical signs of disease or ELISA-positive blood test would not be translocated; and

6. Long-term monitoring of translocated individuals would be implemented to determine the prevalence of disease transmission.

Because ELISA testing can yield false-positive results (i.e., an animal may test positive even though it is not a carrier of the disease), the removal of healthy individuals from the translocated population may occur due to concern over disease. These individuals would be removed from the wild and thereby no longer contribute to the environmental baseline for the action area. Removing these individuals may inadvertently reduce the resistance of the population to disease outbreaks. Because the applicant would coordinate with the Service and follow-up testing of ELISA-positive individuals would be performed, the potential for removing false-positive individuals from the translocated population is low. Consequently, we conclude that few, if any, desert tortoises would be removed from the population due to false-positive results. Similarly, some of the animals that test positive may have survived past disease infections and remain healthy. Despite gaps in our knowledge relative to disease pathology and recognition that removal of seropositive desert tortoises may eliminate individuals with superior fitness and genetic adaptations for surviving disease from the gene pool, the low number of individuals expected to be removed would not be large enough to affect population genetics in the wild.

Apart from disease, translocation may affect resident desert tortoises within the recipient site due to local increases in population densities. Desert tortoises from the project site would be moved to areas now supporting a resident population, which may result in increased inter-specific encounters. These increased encounters lead to an increased potential for spread of disease, potentially reducing the health of the overall population; increased competition for shelter sites and other limited resources; increased competition for forage, especially during drought years; or increased incidence of aggressive interactions between individuals (Saethre *et al*. 2003). To minimize potential density-dependent effects, recipient sites must be sufficiently large to accommodate and maintain the resident and translocated desert tortoises (Service 2010a). However, because a small number of desert tortoises likely will be translocated, density-dependent effects are unlikely.

Based on our estimate of the resident population at the proposed recipient site as discussed in the "Environmental Baseline" section, we calculated the maximum allowable final density[2] and abundance (i.e., residents plus translocatees) at the proposed recipient site. After translocation, density should not exceed 6 tortoises/km^2 (16 tortoises/mi^2) and abundance should not exceed 796[3] individuals. Since we estimated the population at the proposed recipient site to be up to 610 subadult and adult tortoises, we do not anticipate that translocation of up to 10 subadult and adult tortoises (from the project site and perimeter security fence line) to the recipient site would exceed the 130 percent density threshold.

By virtue of its size, the proposed recipient site likely will support all of the desert tortoises to be translocated. We anticipate that density-dependent effects on resident desert tortoise populations are likely to be minor for the following reasons:

1. Health assessments will be performed on all desert tortoises prior to translocation thus decreasing the potential for introduction of infectious diseases to the recipient site;

2. A threshold density has been calculated for the recipient sites so as not to exceed 130 percent of the mean density for the recovery unit. This threshold is significantly lower than that which adverse effects were observed in previous post-translocation studies (Saethre *et al.* 2003);

3. Translocation will be implemented such that individuals are distributed throughout the site;

4. The proposed recipient site is contiguous with suitable desert tortoise habitats, which will facilitate dispersal into other areas; and

5. Long-term monitoring will provide opportunities to implement adaptive management to address any observed unanticipated effects.

The proposed translocation plan (CH2M HILL 2010a) and best available information regarding density estimates and thresholds and methods for determining disease prevalence indicate that all of the desert tortoises expected to be translocated from the project site can be accommodated at the recipient site. However, if disease prevalence or density thresholds prevent the use of the selected recipient sites, the applicant will need to identify alternative suitable areas for translocation. Such alternative translocation area would constitute a change in the project description that likely would necessitate reinitiation of consultation.

After verification of density estimates, receipt of disease screening results, and approval of disposition plans, the applicant will translocate all desert tortoises to the recipient site.

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[2] Defined as 130 percent of the mean density calculated for the respective recovery unit (Service 2010a). Estimated mean density in the Northern Colorado Recovery Unit is 4.6 tortoises/km^2 (12 tortoises/mi^2) (Service 2009b); therefore, maximum allowable density equals 130 percent multiplied by the mean density of the recovery unit (4.6 tortoises/km^2) or 6 tortoises/km^2.

[3] Calculated as 132.7 km^2 for the recipient site multiplied by 6 tortoises/km^2.

Following release, desert tortoises are expected to disperse, but we cannot predict the movement patterns that all translocated individuals are likely to exhibit. Dispersal distances following translocation appear to be influenced by the distance they are moved from their home range and the availability of resources in the area to which they are moved. Desert tortoises translocated relatively short distances [i.e., less than 500 m (1,640 ft)] from their home ranges tend to move shorter distances from their release points than desert tortoises translocated more than 500 m (1,640 ft). Blythe *et al*. (2003) found that Sonoran desert tortoises moved less than 0.80 km (0.5 mi) had returned to their home ranges within a few days. Unless movement barriers are in place, desert tortoises are likely to return to potentially harmful conditions. Nussear (2004) reported that for adult desert tortoises translocated greater than 500 m (1,640 ft), the mean straight-line dispersal distance for both males and females ranged from 1 to 6 km (0.6 to 3.7 mi). Walde *et al*. (2008) reported that the mean straight-line dispersal distances for adult desert tortoises using 2 experimental treatments was approximately 2.6 km (1.6 mi) and 4.2 km (2.6 mi) for males and 1.5 km (0.9 mi) and 2.3 km (1.4 mi) for females. Maximum straight-line dispersal distances for translocated adult males ranged from 6.2 km (3.9 mi) (Field *et al.* 2007) and 12.6 km (7.8 mi) in the first year following translocation (Walde *et al.* 2008).

The degree to which translocated desert tortoises expand the area they use depends on whether individuals are released into typical or atypical habitat; that is, if the recipient area supports habitat that is similar to that of the source area, desert tortoises are likely to move less (Nussear 2004). Translocated desert tortoises appear to reduce movement distances following their first post-translocation hibernation to a level that is not significantly different from resident populations (Field *et al*. 2007, Nussear 2004). As time increases from the date of translocation, most desert tortoises alter their movement patterns from dispersed, random patterns to more constrained patterns, which may indicate establishment of a new home range (Nussear 2004).

Just as we cannot predict the distances translocated desert tortoises will move, we also cannot predict the direction these individuals are likely to move. Berry (1986) observed that translocated desert tortoises have exhibited a tendency to orient toward the location of their capture and attempt to move in that direction, but other research showed no discernible homing tendency in translocation individuals (Field *et al.* 2007). Data specific to short-distance translocations indicate that at least some individuals will attempt to return to their former home ranges after release (Stitt 2003, Rakestraw 1997).

Previous translocation studies generally have shown straight-line dispersal distances from release points vary during the first year following translocation. While the mean straight-line distances reported for several studies are close to or less than 2.5 km (1.6 mi), some translocated desert tortoises move much farther (Drake *et al*. 2009, Field *et al*. 2007, Nussear 2004). Based on our analysis of the available data, we expect the movements of most tortoises translocated more than 500 m (1,640 ft) to remain within 6.5 km (4.0 mi) of their release points. This distance derived by examining the upper limits of the 95 percent confidence intervals for available data. However, as mentioned above, translocated individuals can also significantly expand the area they occupy in the first year following translocation [e.g., 10.1 to 17.9 km^2 (3.9 to 6.9 mi^2) at a Nevada site and from 0.5 to 26.7 km^2 (0.2 to 10.3 mi^2) at a Utah site].

In one study, the majority of dispersal movement away from the release site occurred during the first 2 weeks after translocation (Field *et al*. 2007). During this time and over the period prior to establishment of a new home range, translocated desert tortoises may experience higher potential for mortality because they are moving through unfamiliar habitats and are less likely to have established cover sites that provide protection. Studies have documented various sources of mortality for translocated individuals, including predation, exposure, fire, disease, and flooding (Nussear 2004, Field *et al*. 2007, Berry 1986, U.S. Army 2009, 2010). Of these, predation appeared to be the primary mortality mechanism in most translocation studies (Nussear 2004, Field *et al*. 2007, U.S. Army 2009, 2010).

Various studies have documented mortality rates of 0, 15, 21, and 21.4 percent of translocated desert tortoises in other areas (Cook *et al.* 1978, Nussear 2004, Field *et al.* 2007). Nussear (2004) found that mortality rates among translocated desert tortoises were not statistically different from that observed in resident populations. However, because this study did not compare mortality rates in resident populations to those in control groups, we cannot determine if the translocation caused increased mortality rates in the resident population. Recent studies in support of the Fort Irwin expansion (U.S. Army 2009, 2010) compared mortality rates associated with resident and translocated desert tortoise populations with that of control populations; preliminary results indicated translocation did not increase mortality above natural levels (Esque *et al*. 2010). This and other fieldwork indicate that desert tortoise mortality is most likely to occur during the first year after release. After the first year, translocated individuals are likely to establish new home ranges and mortality is likely to decrease.

Juvenile desert tortoises will make up a portion of the overall mortality predicted within resident and translocated populations. In general, this life stage experiences higher mortality rates than subadults and adults under natural circumstances and are more susceptible to predation. We estimate two to eight juvenile desert tortoises may occur on the project site and that the applicant may move up to half of these; therefore, we do not anticipate a large amount of juvenile mortality associated with translocation. Because of the difficulty in locating juvenile desert tortoises, individuals that are not translocated are likely to die during construction activities. However, as stated above for direct effects from construction and O&M, based on the estimated desert tortoises expected to occur within the action area and the conservation measures that have been identified for each project component, we conclude that death and injury resulting from translocation of juvenile desert tortoises will not appreciably reduce the desert tortoise population or reproductive success within the Northern Colorado Recovery Unit.

Based on the available data on translocation and consistent with the findings in Esque *et al.* (2010), we anticipate that mortality rates in the resident and translocated populations are unlikely to be elevated above levels that these populations would experience in the absence of translocation. Therefore, we anticipate that death or injury of few, if any, subadults, adults, juveniles, or eggs will be the direct result of translocation. The monitoring of the translocated, resident, and control populations will assist us in determining if this conclusion is accurate. While the proposed monitoring program considers observations of a control population that will not be affected by the translocation, it does not establish mortality thresholds or adaptive

management measures in the event that significant differences in mortality rates are observed among the populations that can be attributed directly to capture and release of individuals due to translocation or to indirect effects such as predation. Therefore, we cannot analyze the adaptive management component of the translocation plan or its effectiveness in addressing elevated mortality rates. Despite this uncertainly, because few individuals are expected to be translocated from the project site, we conclude that death and injury resulting from translocation of subadult and adult individuals will not appreciably reduce the desert tortoise population or reproductive success within the Northern Colorado Recovery Unit.

Based on the pre-project survey data, we have estimated that up to nine desert tortoises are likely to be moved during construction of the gen-tie alternatives. However, despite this estimate, all desert tortoises encountered during construction of the gen-tie would be moved out of harm's way. Because disturbance areas for this project component are relatively small, moving desert tortoises immediately outside of the work area is not likely to displace them from their current home ranges. Thus, any desert tortoises moved from the gen-tie alignment will continue to occupy familiar territory and use known shelter sites and is unlikely to suffer post-translocation mortality associated with temporary removal from the disturbance areas. Furthermore, subsequent to project completion, desert tortoises will be able to return to these areas.

Finally, to prevent translocated desert tortoises from entering nearby roadways following translocation, the applicant would construct temporary desert tortoise exclusion fencing along SR 62. However, because this reach of the highway has Arizona crossings, washouts of the fence are likely to occur during runoff events, potentially causing desert tortoises to become trapped along the highway corridor. A fence along SR 62 could also create a barrier to gene flow (see discussion below). Because of these concerns, temporary fencing would be installed to reduce impacts to desert tortoises during construction; daily monitoring would ensure any individuals that had become trapped would be released and breaches in the fence would be addressed immediately. Because the fence would occur within the road ROW that is largely disturbed and desert tortoise abundance has been documented to be depressed along roadways (Boarman and Sasaki 2006), we expect this activity to affect few desert tortoises or eggs.

In conclusion, we do not anticipate that moving desert tortoises out of harm's way of construction of linear features would result in death or injury because these individuals would remain near or within their existing home range, which is not likely to result in significant social or competitive impacts to resident desert tortoises in the area. Following release of desert tortoises translocated outside of their home range, a small number may die due to exposure, stress, dehydration, inadequate food resources, and increased predation, particularly in the first year after release, as translocated animals establish new home ranges (Nussear 2004, Field *et al*. 2007, Berry 1986, U.S. Army 2009, 2010). We also anticipate that a small number of resident desert tortoises at the recipient site may die from natural causes due to these same vulnerabilities. However, we do not anticipate mortality rates in the translocated and resident populations to be above natural mortality levels for the recipient site (Esque *et al*. 2010). The potential impacts of capturing, handling, and moving tortoises for the purposes of translocation would be avoided or reduced through implementation of BIO-1 through BIO-8, BIO-14, BIO-15, and BIO-17

included as part of the proposed action. Lastly, as described in the translocation plan, translocated desert tortoises will be monitored, findings reported to the Service, and adaptive management strategies implemented, as needed (CH2M HILL 2010a).

Desert Tortoise Translocation: Post-Translocation Monitoring

Based on the estimated number of desert tortoises on the project site, we anticipate that the applicant will attach transmitters to no more than 30 subadult and/or adult desert tortoises (i.e., 10 each of translocated, resident, and control animals) to facilitate monitoring. However, based on the observation of one live desert tortoise on the project site, the monitoring of any resident or control animals ultimately may not be required. Desert tortoises to be monitored will have transmitters attached and be handled periodically for visual health assessments throughout the monitoring period. As previously stated, some potential exists that handling of desert tortoises may cause elevated levels of stress that may render these animals more susceptible to disease or dehydration from loss of fluids. However, because the applicant will employ experienced biologists, approved by the Service, BLM, and CDFG, and sanctioned handling techniques to perform health assessments, we do not expect handling and monitoring activities to result in death or injury of any individuals.

Effects of Accessing Work Sites

Increased vehicle travel from the construction and improvement of access roads could disturb or kill individual tortoises, and as presented under the "Description of the Proposed Action" section, 15.0 ha (36.9 ac) would be impacted during construction of the access road and gen-tie line. During the 24-month construction period in which the workforce is at its largest, an estimate of the average daily traffic could total 765 trips. Likewise, during this period, the average total of construction truck traffic would be approximately 90 trips per day. However, for all other periods during construction and largely during O&M activities, daily average vehicle activity would be less. Increased vehicle traffic along the existing access road to the Black Point Communication Site would occur over a short period (i.e., 1 to 3 days), and access for O&M activities would be infrequent. No impacts to desert tortoises are expected along the access routes to the passive reflector site because no suitable habitat for the species occurs in the area.

The potential for the most severe impacts are along paved roads where vehicle frequency and speed are greatest, although desert tortoises on dirt roads may also be affected depending on frequency of vehicle use and speeds. Census data indicate that desert tortoise numbers decline as vehicle use increases (Bury *et al*. 1977) and desert tortoise sign increases with increased distance from roads (Nicholson 1978). Likewise, Boarman and Sazaki (2006) found that desert tortoise populations are depressed next to major roadways out to a distance of at least 0.4 km (0.25 mi). Additional impacts may result from casual use of the new and existing roads in the project area, including unauthorized route establishment.

Implementation of conservation measures associated with the project would minimize impacts to desert tortoise from the construction and use of access roads. All project personnel will be

required to participate in the WEAP (BIO-6) and speed limits will be limited to 32 kph (20 mph) or less, resulting in workers being less likely to strike desert tortoises than a casual user. BIO-8 includes measures such as limiting the disturbance area associated with linear features by clearly delineating construction boundaries with stakes, flagging, and temporary or permanent desert tortoise exclusion fencing, and the use of Authorized Biologists and Biological Monitors during construction and O&M activities will minimize adverse effects to desert tortoises (BIO-1 through BIO-5). Subsequent to construction, speed limit and WEAP requirements will continue to be implemented over the life of the project. Though we cannot predict the number of individuals that would be killed or injured because of variables like weather conditions, the nature and condition of the roads, and activity patterns of desert tortoises at the time the roads are in use, we expect this number to be small.

Effects of Loss of Habitat

Because vegetation recovery in the desert can take decades or longer, we consider all ground-disturbing impacts associated with the project to be effectively permanent. Vasek *et al*. (1975) found that in the Mojave Desert, transmission line construction and O&M activities resulted in a permanently de-vegetated maintenance road, enhanced vegetation along the road edge and between tower sites (often dominated by nonnative species), and reduced vegetation cover under the towers, which recovered significantly but not completely in about 33 years. Webb (2002) determined that absent active restoration following extensive disturbance and compaction in the Mojave Desert, soils in this environment could take between 92 and 124 years to recover. Other studies have shown that recovery of plant cover and biomass in the Mojave Desert may require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Based on a quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran deserts, Abella (2010) found that reestablishment of perennial shrub cover (to amounts found on undisturbed areas) generally occurs within 100 years but no fewer than 40 years in some situations. He also found that a number of variables likely affect vegetation recovery times, including but not limited, to climate (e.g., precipitation and temperatures), invasion by nonnative plant species, and the magnitude and extent of ongoing disturbance.

While the applicant would implement restoration activities following decommissioning, such as decompacting soils, seeding, and nonnative species control, based on this information, construction of the project would result in the long-term disturbance of 586.0 ha (1,448.4 ac) of desert tortoise habitat for a minimum of 30 years. Therefore, when and if successful restoration of these areas would render the habitat suitable for desert tortoises in the future cannot be determined at this time. As noted in the "Description of the Proposed Action" section, if the project is approved, analysis and regulatory review of potential effects of decommissioning would be deferred until closure of the project is foreseeable.

Based on the work by Nussear *et al.* (2009), we calculated that approximately 932,764 ha (2,304,910 ac) or 73 percent of the 1,275,286 ha (3,151,300 ac) Northern Colorado Recovery Unit is considered habitat modeled at the 0.5 or greater "predicted habitat potential level" for desert tortoise. The habitat that would be disturbed on a long-term basis [i.e., up to 586 ha

(1,448 ac)] constitutes approximately 0.0006 percent of the modeled habitat in the Northern Colorado Recovery Unit. While the model does not take into account anthropomorphic disturbances that have historically or are currently affecting the species, consideration of such disturbance likely would not result in a substantial change in this estimate; less than 10 percent of the lands within the Sonoran Desert ecoregion are categorized as "disturbed lands" (Marshall *et al*. 2000). However, in light of existing research on edge effects along roads (Bury *et al*. 1977, Nicholson 1978, Boarman and Sasaki 2006), areas of suitable habitats within 0.4 km (0.25 mi) on either side of portions of SR 62, SR 66, I 95, and I 40 in the Northern Colorado Recovery Unit may support depressed desert tortoises densities because of these effects.

Although this percentage (0.0006) does not constitute a numerically significant portion of the Northern Colorado Recovery Unit, we do not have the ability to place a numerical value on edge effects from utility-scale solar energy projects, habitat degradation, and overall fragmentation that the proposed action may cause or that occurs in the recovery unit as a whole. As a result, the low percentage of habitat within the recovery unit that would be lost underestimates the impact of the project on the desert tortoise, especially in light of existing land uses, changes in species composition and fire regimes due to establishment of nonnative plant species, existing and increasing disease and predation rates, and the expansion of human occupancy in what were once remote desert landscapes. The draft revised recovery plan (Service 2008) and 5-year review (Service 2010d) provide detailed discussions of these and other past, present, and future threats facing the desert tortoise.

Indirect Effects

Indirect effects associated with the project construction and O&M may result in death or injury to desert tortoises. Some of these effects include increased predation by common ravens, loss or fragmentation of habitat linkages important to maintaining population and genetic connectivity, degradation of habitat and the diet of desert tortoises from the spread of nonnative plant species, and noise and lighting from project construction and operations.

Predator Subsidies: Common ravens are attracted to human activities in the desert because food and water subsidies, and roosting and nesting substrates that would otherwise be unavailable are introduced or augmented by human encroachment. Human activities also facilitate expansion of raven populations into areas where they were previously absent or in low abundance. Ravens likely will frequent the project areas because of the potential availability of such subsidies, which are now found in and around the aqueduct and nearby rural and urban areas. Road-kill of wildlife along SR 62 and other roads provides additional attractants and subsidies for opportunistic predators and scavengers. Road-kill is likely to increase during project construction and O&M activities, increasing the raven/predator attractions and the risk of predation on desert tortoises.

Facility infrastructure, such as power poles, fences, buildings, and other structures on the project site, may provide perching, roosting, and nesting opportunities for ravens and other avian predators. Natural predation rates may be altered or increased when natural habitats are

disturbed or modified. As stated above, common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in the Mojave Desert prior to 1940, the existing level of raven predation on juvenile desert tortoises is considered an unnatural occurrence (BLM 1990). In addition to ravens, feral dogs have emerged as significant predators of desert tortoises adjacent to residential areas. Though feral dogs may range several miles into the desert and have been found digging up and killing tortoises (Service 1994a, Evans 2001), we are not aware of any reports of feral dogs in the project area.

To avoid and minimize the availability of predator subsidies from construction and O&M-related activities, project design, construction monitoring, and post-project monitoring will be implemented in accordance with the draft raven management plan for the project (CH2M HILL 2010b), as finalized and approved. Some of the provisions of the plan include proper disposal of all trash materials in self-closing containers, removal of road-kill from the project area and associated access roads immediately upon discovery, and minimizing the amount of water used for dust abatement to avoid standing water. In addition, the applicant will contribute funds to the regional common raven management program, which addresses indirect and cumulative impacts associated with projects that facilitate the expansion of raven populations into desert tortoise habitats. Funding implementation of this program is expected to enable the Service and other agencies to monitor and control raven populations at the regional scale. The applicant will submit payment to the project sub-account of the California Renewable Energy Action Team account held by the National Fish and Wildlife Foundation to support the Service's regional raven management program. The amount would be a one-time payment of $105/ac of long-term or permanent disturbance, totaling $152,040 for disturbance area of 586 ha (1,448 ac) (to be adjusted according to final project footprint) (BIO-17 in CEC 2010b).

Nonnative Plant Species: Another indirect effect from the development of the project is the potential introduction and spread of nonnative, potentially invasive plant species into habitats adjacent to the project sites. Though nonnative plant species now occur on the project site at various densities and within the action area, and numerous existing features act as vectors that facilitate infestations (e.g., roads, routes, transmission lines, railroad, Colorado River Aqueduct), construction and O&M activities of the project components may increase distribution and abundance of nonnative species within the action area due to ground-disturbing activities that favor nonnatives. Project equipment may transport nonnative propagules into the project area where they may become established and proliferate. The introduction of nonnative plant species also may lead to increased wildfire risk, which ultimately may result in future habitat losses (Brooks *et al*. 2003) and changes in forage opportunities for desert tortoises (Service 2008).

The applicant has proposed numerous measures as part of the proposed action to address the potential effects from nonnative plant species. While we cannot reasonably predict the increase in nonnative species abundance that this project may cause within the action area, the degradation of habitat due to spread of nonnative plants would be minimized through the measures outlined in the development and implementation of a weed management plan (BIO-11). The applicant will also implement BMPs when applying herbicides to control weeds to

ensure their use would have minimal effects to adjacent habitats. The final plan would include weed control measures for target weeds with a demonstrated record of success, based on the best available information from sources such as The Nature Conservancy, California Invasive Plant Council, and the California Department of Food & Agriculture.

Edge Effects: Finally, increased noise levels and the presence of full-time facility lighting may affect desert tortoise behavior during construction and operations of the facility over a 30-year period. While limited data exists on the effect of noise on desert tortoises, Bowles *et al.* (1999) demonstrated that the species has relatively sensitive hearing (i.e., mean = 34 dB SPL), but few physiological effects were observed with short-term exposures to jet air craft noise and sonic booms. These results cannot be extrapolated to chronic exposures over the lifetime of an individual or a population. We also do not have sufficient data documenting the effects of artificial lighting on desert tortoise behavior and therefore cannot reasonably predict the magnitude of effect either noise or light will have on adjacent desert tortoise populations. Based on the ability of other species to adapt to noise disturbance, noise attenuation as distance from the project increases, and the fact that desert tortoises do not rely on auditory cues for their survival, we do not expect any desert tortoises to be injured or killed as a result of project-related noise impacts. In addition, the applicant has included measures as part of the proposed action to minimize noise and light-related impacts to the species (BIO-8 in CEC 2010b).

Another type of edge effect affecting desert tortoise populations results from roads and highways (Bury *et al*. 1977, Nicholson 1978, Boarman and Sasaki 2006). Boarman and Sazaki (2006) found that desert tortoise populations are depressed next to major roadways out to a distance of at least 0.4 km (0.25 mi). Therefore, as discussed above, desert tortoise densities may be depressed in areas of suitable habitats within 0.4 km (0.25 mi) on either side of portions of I-10, SR 177, and other well-traveled roadways in the Eastern Colorado Recovery Unit.

Because few data exist relative to edge effects from noise, light, vibration, and increased dust from construction and O&M activities, we cannot determine how these potential impacts may affect desert tortoise populations adjacent to the development sites. The lack of information is especially relevant when evaluating effects to individuals within the habitat linkage that would be impacted by the proposed project. Thus, the magnitude and extent of these edge effects cannot be articulated at this time, but conceivably could disturb individual desert tortoises to the extent that they abandon all or a portion of their established home ranges and move elsewhere.

Habitat and Population Connectivity: The loss of habitat associated with construction and O&M of project facilities may act as a barrier to the natural movements within affected home ranges of individual desert tortoises bordering the project site, but the number of individuals affected would be relatively small compared to the regional population within the recovery unit. Contiguous, suitable habitats to the west and east of the project would remain, allowing for continued north-south population connectivity on a landscape scale. These habitats coincide with numerous siphon crossings of the Colorado River Aqueduct, and associated bridges along the parallel Arizona-California Railroad and SR 62. This network of siphons and bridges allows for safe movement by individuals under the highway and railroad (and over the aqueduct), but

desert tortoises also remain vulnerable to vehicular-related mortality because the highway does not have desert tortoise fencing that directs them into the bridge/siphon system. Thus, the project would not pose significant effects to connectivity between desert tortoise CHUs and other conserved lands adjoining the Rice Valley despite its location within a WHMA designated for wildlife habitat connectivity (BLM 2002).

During construction of the project, a temporary fence surrounding the logistics and laydown areas would be built over a distance of about 975.4 m (3,200 ft) and 30.5-m (100-ft) south of SR 62 to provide a buffer area between the road shoulder and the fence line. This temporary fence would further limit north or south movement by reducing access to suitable crossing points. Individuals moving southward through those crossings would be forced to travel longer distances parallel to the highway before continuing southward and, as a result, would lead to an increased risk of road mortality. However, the temporary fence would be removed after construction, leaving the permanent perimeter security fence around the project site (CEC 2010a).

The project would obstruct habitat linkages between the Rice Valley and the Turtle Mountains by way of the two siphon crossings along the Colorado River Aqueduct due north of the project site. Animals moving northward from the valley would be diverted to the east or west by the perimeter fence around the project site. They might reach either of the two nearby crossings by following a semicircle around the fence, but they would be more likely to continue east or west towards any of the other siphons crossing the aqueduct to either side of the project site. Animals moving east or west that encounter the perimeter security fence would be directed north or south around the project site. Individuals directed northwards may become confined within the narrow passage between the three barriers (e.g., SR 62, railroad, aqueduct) north of the project site. This path would present a greater risk of road mortality than presently exists in the area. The applicant would implement conservation measures, particularly BIO-21, to minimize highway mortality and impacts to wildlife movement.

Effects of Land Acquisition and Conservation

Although the acquisition and protection of suitable desert tortoise would not create new habitat within the recovery unit, this action would ensure that desert tortoise habitat would be managed for the conservation of the species within targeted conservation areas. Acquisition, management, and permanent protection of any newly acquired lands may facilitate a reduction in the number and magnitude of threats and mortality mechanisms in areas not currently protected within the Northern Colorado Recovery Unit.

Effect on Recovery

The primary purposes of the Act (section 2(b)) are to provide a means whereby the ecosystems upon which listed species depend may be conserved, and to provide a program for the recovery of listed species. Per section 2(c), Congress established a policy requiring all Federal agencies to use their authorities in seeking to recover listed species in furtherance of the purposes of the Act. Consistent with these purposes and Congressional policy, sections 3(5), 4(f), 7(a)(1), and the

implementing regulations (50 CFR § 402.02) to section 7(a)(2), and related preamble at 51 FR 19926 to 19957, generally require Federal agencies to further the survival and recovery of listed species in the use of their authorities. Pursuant to these mandates, our analysis below assesses: 1) whether the proposed action adequately offsets its adverse effects to the environmental baseline to the desert tortoise; and 2) the extent to which the proposed action would cause "significant impairment of recovery efforts" or adversely affect the "species' chances for survival to the point that recovery is not attainable" (51 FR 19934).

Based on pre-project surveys, the project would affect a relatively small number of animals. The applicant would implement numerous conservation measures as part of the proposed action to avoid and minimize the extent of incidental taking from construction, O&M, and translocation activities, and offset the adverse effects of habitat loss to desert tortoises in the project areas. Located near the center of Rice Valley, the project also would not interfere with the overall availability of suitable habitat and desert tortoise distribution across the valley in general. As such, the project would not affect habitat and population connectivity on a landscape scale.

We do not anticipate that the loss of habitat in the project areas would substantially reduce the ability of desert tortoises to survive for the foreseeable future in the wild. This conclusion is based on the assumption that the majority of higher value habitat areas generally found within designated CHUs or other conserved lands in the 1994 recovery plan (Service 1994a) and draft revised recovery plan (Service 2008), will be conserved. The proposed long-term conservation of up to 615.9 ha (1,522.0 ac) of the ownership parcel, which supports desert tortoise habitat, would ensure that no additional impacts in the immediate project vicinity would occur.

The proposed action would not appreciably reduce the range-wide distribution of desert tortoises because the total acreage equates to a small percentage of the Northern Colorado Recovery Unit, which totals over 1.2 million ha (3.1 million ac) and includes the Chemehuevi CHU/DWMA. Based on this analysis, we conclude that because the area impacted by the proposed action does not constitute a substantial portion of the recovery unit, this project alone will not preclude recovery of the species within the Northern Colorado Recovery Unit.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, tribal, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Based on information provided in the SA/DEIS (CEC 2010a), we are not aware of other future, non-Federal projects reasonably certain to occur within the action area.

CONCLUSION

After reviewing the current status of the species, environmental baseline for the action area, effects of the proposed action, and cumulative effects, it is the Service's biological opinion that

the proposed action is not likely to jeopardize the continued existence of the desert tortoise. We base this conclusion on the following:

1. The applicant would implement conservation measures and CEC conditions of certification as part of the proposed action to ensure that mortality and injury of desert tortoises are minimized (Western 2011a, CEC 2010b). Measures include, but are not limited to, employing Authorized Biologists and Biological Monitors throughout project construction and O&M activities, performing pre-construction clearance surveys and translocation of desert tortoises, and installing permanent and temporary desert tortoise exclusion fencing.

2. The applicant would implement translocation in accordance with the most current Service guidance to ensure as many individuals are removed from the project sites as possible and to minimize any risk such that few, if any, desert tortoises are killed or injured due to translocation.

3. The applicant would implement measures to reduce the potential for increased predation by common ravens, both in close proximity to the project area and regionally.

4. The applicant would implement measures to avoid, minimize, and control the introduction of and spread of nonnative plant species.

5. The best available data relative to densities of the Mojave population of the desert tortoise do not document a statistical population trend for this recovery unit. Hence, we do not have information to indicate that the loss of a relatively small number of individuals as a result of the proposed action would appreciably reduce our ability to achieve recovery objectives within the Northern Colorado Recovery Unit.

6. Successful translocation of desert tortoises by the applicant to an approved recipient site would minimize some adverse effects of the proposed action by allowing those individuals to remain in the population and contribute towards recovery of the species.

7. The limited reduction in habitat and population connectivity is not likely to adversely affect the recovery potential of the species beyond the lifespan of the project.

8. Land acquisition required by Western, BLM, CEC, and CDFG would offset impacts to desert tortoise habitat, and acquired lands would be managed for the long-term conservation and recovery of the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act, and Federal regulation pursuant to section 4(d) of the Act, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat

modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below for desert tortoises are non-discretionary and must be undertaken by Western and BLM so that they become binding conditions of any grant, permit, or decision document issued to the applicant/permittee, as appropriate, for the exemption in section 7(o)(2) to apply. Western and BLM have a continuing duty to regulate the activity covered by this incidental take statement. If Western or the BLM: 1) fail to assume and implement the terms and conditions; or 2) fail to require the applicant/permittee to adhere to the terms and conditions of the incidental take statement through enforceable stipulations that are incorporated into the grant, permit, or decision document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, Western and BLM must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT AND EXTENT OF TAKE

The proposed action will result in the take of all desert tortoises in the project areas (i.e., within the solar generating facility site; along the gen-tie and associated access road; within the switchyard site; in areas where exclusion fencing would be installed; and within recipient and control sites, if necessary) as a result of construction and long-term O&M of the project, moving individuals out of harm's way, and from translocation and subsequent health assessments during the monitoring period. However, we cannot precisely quantify the amount of take that will occur during these activities. Some of the constraints that make it difficult to determine desert tortoise densities and abundance include the cryptic nature of the species (i.e., individuals spend much of their lives underground or concealed under shrubs), inactivity in years of low rainfall, and low abundance across a broad distribution within several different habitat types. In addition, population numbers and distribution of individuals fluctuate in response to weather patterns and other biotic and abiotic factors over time; hence, it is likely that the numbers and distribution of desert tortoises within the project area have changed since project-specific surveys were completed. The number of juvenile desert tortoises and eggs is even more difficult to quantify because of small size, their location underground, and low detection probabilities during surveys. The following paragraphs define the form of take and the number of individuals we anticipate the proposed action will take.

Loss of Habitat

The disturbance of up to 586.1 ha (1,448.4 ac) of habitat from construction of the solar energy generating facility, gen-tie, and associated access roads and O&M-related activities may result in accidental death or injury of subadults, adults, and juvenile desert tortoises and eggs from crushing, trampling, or burial. If the project-related activities result in impacts to desert tortoise habitat beyond this identified acreage, the amount and extent of take will be exceeded.

Construction and O&M

Solar Energy Generating Facility Site

As discussed in the "Environmental Baseline" section, we estimate that up to 10 subadult and adult desert tortoises, up to 8 juveniles, and 43 eggs may occur within the project site. The applicant will construct permanent or temporary desert tortoise exclusion fencing around construction zones, locate most individuals during preconstruction clearance surveys, and implement numerous conservation measures to avoid and minimize adverse project effects to desert tortoises. Consequently, we anticipate that construction of the solar energy generating facility and associated components (i.e., gen-tie line, associated access roads, switchyard, and perimeter security fence) is likely to take, in the form of mortality or injury, no more than one (1) subadult and adult desert tortoise.

For the anticipated take, in the form of mortality or injury, of juvenile desert tortoises and eggs resulting from construction of the project , we would consider the amount or extent of that taking to be exceeded if the number of subadult and adult desert tortoises captured or collected on the project sites and perimeter fence lines exceeds 10 individuals (i.e., the high end of the range of the 95 percent confidence interval calculated for the solar energy generating facility site). We have established this threshold because Western and BLM will not be able to accurately monitor the actual incidences of death and injury resulting from the construction of the project (i.e., up to 8 juveniles and 43 eggs on the solar energy generating facility site) due to the likelihood that individuals missed during clearance surveys and killed during construction will be juveniles or eggs and locating the carcasses or shell fragments would not be feasible. To address this issue we have used the threshold for capture or collection of subadult and adult individuals on the solar energy generating facility site as a surrogate measure of mortality of the smaller size classes. Using this threshold as a surrogate assumes that our method of calculating the number of reproductive females, which is based on the estimated abundance of subadult and adult desert tortoises on the project site, allows us to also calculate the number of juveniles and eggs that may be affected. Consequently, finding more than 10 subadult and adult desert tortoises would indicate that a larger number of juveniles and eggs may be killed or destroyed during construction. Because clearance surveys would occur prior to commencement of construction activities, use of this threshold would allow reinitiation of consultation and a reassessment of the estimated mortality prior to any mortality occurring on the ground.

Activities associated with O&M of the solar energy generating facility likely will not result in any incidental take because all activities, with the exception of fence repair, will occur within the perimeter security fence. Maintenance and repair of the perimeter security fence may result in incidental take, in the form of mortality or injury, of no more than one (1) subadult or adult desert tortoise per calendar year.

Although unlikely, desert tortoises that were undetected during clearance surveys for construction may be located during O&M activities. Though we do not know how many desert tortoises may subsequently be detected, all individuals will be captured and translocated and any desert tortoise eggs that are located will be excavated and translocated. Thus, take, in the form of capture and collection, of all subadult, adult, and juvenile desert tortoises and eggs resulting from these incidental detections is exempted to ensure mortality and injury of desert tortoises is minimized.

Gen-tie Line and Switchyard

Up to nine subadult and adult desert tortoises were estimated along the gen-tie alignment and associated access road, which includes the switchyard, though the actual number of individuals that may be moved out of harm's way along this component is unknown. Because of the low densities expected to occur in the action area and because the applicant will implement the conservation measures identified under the proposed action, take, in the form of capture and collection, is anticipated for few, if any, individuals located during O&M activities along the gen-tie and associated access roads.

Take, in the form of mortality, of no more than one (1) subadult or adult desert tortoise per calendar year is anticipated during O&M activities. This low number can be attributed to the following factors: access would be limited along existing routes and the applicant would implement numerous conservation measures, including the use of experienced biologists (i.e., Authorized Biologists approved by the Service, BLM, and CDFG).

Telecommunications Site

No new disturbance will result from the addition of a tower and microwave dish at the existing Black Point Telecommunication Site. Therefore, no take, in any form, of desert tortoises is anticipated from construction of this project component. In addition, no desert tortoise habitat occurs within the passive reflector site; therefore, no take of desert tortoises is anticipated from construction of this project component. Finally, O&M activities associated with these two project components is not anticipated to result in any future disturbance to desert tortoises or their habitats; therefore, no take, in any form, of desert tortoises is exempted for these activities.

Desert Tortoise Translocation

Take, in the form of capture or collection, of up to 10 subadult and adult desert tortoises, up to 8 juveniles, and 43 eggs may occur for the purpose of translocation from the project site during construction activities. Capture or collection of any juveniles or eggs found alive on the project site would be subtracted from the number (8 and 43 respectively) of juveniles and eggs exempted for take in the form of mortality and injury above. We emphasize that these numbers are estimates based on pre-project survey results and the upper limit of the 95 percent confidence range; the actual number of individuals requiring translocation is likely to be lower. Therefore, we do not anticipate that more than 10 subadult and adult desert tortoises will be captured or collected for translocation during construction of the solar energy generating facility.

Because the applicant will employ experienced biologists (i.e., Authorized Biologists approved by the Service, BLM, and CDFG) to perform health assessments and collection of biological samples, if necessary, we do not expect these activities to result in death or injury of any individuals. As such, we do not want to limit the ability of the Authorized Biologists to avoid and minimize the direct injury or death of desert tortoises by translocating individuals located during preconstruction clearance surveys. Thus, all take in the form of capture or collection for the purposes of translocation is exempted for any subadult, adult, or juvenile desert tortoises and eggs located during clearance surveys, post-translocation monitoring activities, or other incidental observations, subject to the reasonable and prudent measures and terms and conditions described below.

Because of the precautions taken to avoid incidental death or injury of desert tortoises during translocation and subsequent monitoring, we do not anticipate take in this form from handling or performing health assessments. However, other environmental, physiological, or predation factors may result in mortality or injury to translocated individuals. Therefore, take, in the form or mortality or injury of no more than two (2) desert tortoises over the life of the project is anticipated from translocation but not directly attributed to the handling of desert tortoises by Authorized Biologists.

Recipient (Translocation) Site

If more than five (5) individuals will be translocated from the project site, take, in the form of capture or collection, of desert tortoises at the recipient sites will occur in support of translocation activities. Based on our estimate of 610 subadult and adult desert tortoises at the proposed recipient site, we anticipate that health assessments, including collection of biological samples, and affixing transmitters would be performed on 48 to 100 of these individuals. Forty-eight is the minimum sample size needed to detect less than 5 percent disease prevalence at the 95 percent confidence level within the resident population with zero positive results (Averill-Murray 2010). Consequently, take, in the form of capture or collection, in support of translocation activities is exempted for up to 100 subadult, adult, or juvenile desert tortoises at the recipient site.

Although such an invasive procedure presents increases the likelihood that individuals may be injured or killed, we do not anticipate that the collection of blood samples will result in the death or injury of any individuals at the recipient site because experienced biologists (i.e., Authorized Biologists approved by the Service, BLM, and CDFG) will perform health assessments in accordance with the most recent Service guidance (Service 2010a). Because ground-disturbing activities would not occur at the recipient site, no eggs are expected to be impacted from translocation activities.

Potential Control Site

If more than five (5) individuals would be translocated from the project site, take, in the form of capture or collection, of up to 10 subadult and adult and up to 8 juvenile desert tortoises is anticipated at a control site as part of the post-translocation monitoring program. Activities would include attaching transmitters and conducting periodic health assessments over the monitoring period (minimum of 5 years).

Because the applicant will employ experienced biologists (i.e., Authorized Biologists approved by the Service, BLM, and CDFG) and use sanctioned handling techniques to perform health assessments and collection of biological samples, if necessary, we do not expect these activities to result in death or injury of any individuals. Because ground-disturbing activities would not occur at the control site, no eggs are expected to be impacted from translocation activities.

Desert Tortoise Translocation: Post-translocation Monitoring

As stated above for the proposed recipient and control sites, if more than five (5) individuals would be translocated from the project site, take, in the form of capture and collection, of up to 10 subadult and adult and up to 8 juvenile desert tortoises is anticipated at each of the recipient and control sites as part of the post-translocation monitoring program. Activities would include attaching transmitters and conducting periodic health assessments. Although transmittered desert tortoises may be captured multiple times over the course of the post-translocation monitoring period, we do not anticipate that any desert tortoises will be directly killed or injured due to post-translocation monitoring activities.

IMPACT OF THE INCIDENTAL TAKING OF THE SPECIES

In the accompanying biological opinion, the Service determined that these levels of anticipated take associated with this project alone are not likely to jeopardize the continued existence or adversely affect the recovery of the desert tortoise.

REASONABLE AND PRUDENT MEASURES

Western, BLM, and applicant will implement numerous conservation measures as part of the proposed action to minimize the incidental take of desert tortoises. Our evaluation of the proposed action is based on the assumption that the conservation measures as set forth in this

biological opinion, and detailed in the biological assessment for the project (Western 2011a) and commission decision (CEC 2010b) will be implemented. Any changes to the conservation measures proposed by Western, BLM, or applicant or in the conditions under which project activities were evaluated may constitute a modification of the proposed action. If this modification causes an effect to desert tortoises that was not considered in the biological opinion, reinitiation of formal consultation pursuant to the implementing regulations of section 7(a)(2) of the Act (50 CFR §402.16) may be warranted. The following reasonable and prudent measures supplements and clarifies select conservation measures contained herein. The reasonable and prudent measures are necessary and appropriate to minimize the impact of take on desert tortoises.

1. Western, BLM, and applicant shall ensure the level of incidental take anticipated in this biological opinion is commensurate with the analysis contained herein.

2. Western, BLM, and applicant shall adhere to procedures set forth by CDFG when moving sick or injured desert tortoises out of the State of California.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, Western, BLM, and applicant, and all agents and/or contractors, must comply with the following term and condition, which implements the reasonable and prudent measure described above, and are intended to minimize the impact of incidental take on the desert tortoise. These terms and conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1:

    a. To ensure that the measures proposed by Western, BLM, and applicant are effective and properly implemented, Western and BLM must contact the Service immediately if it becomes aware that a desert tortoise has been killed or injured as a result of project activities. At that time and in coordination with the Service, Western, and BLM must review the circumstances surrounding the incident to determine whether additional protective measures are required. Project activities may continue pending outcome of the review, provided the conservation measures set forth in the proposed action and the term and condition in this biological opinion have been and continue to be fully implemented.

    b. If one (1) subadult or adult desert tortoises are directly killed or injured as a result of construction of the solar energy generating facility and associated gen-tie, switchyard, and access road covered by this biological opinion, Western and BLM must reinitiate consultation on the proposed action.

    c. If one (1) subadult or adult desert tortoise is directly killed or injured in any 1 calendar year as a result of any O&M activities covered by this biological opinion along the

perimeter security fence of the solar energy generating facility site, Western and BLM must reinitiate consultation on the proposed action.

d. If one (1) subadult or adult desert tortoise is directly killed or injured in any 1 calendar year as a result of any O&M activities associated with the gen-tie, switchyard, and access road covered by this biological opinion, Western and BLM must reinitiate consultation on the proposed action.

e. No take, in any form, of desert tortoises is anticipated during construction or O&M activities covered by this biological opinion for the Black Point Communication Site and access road. Therefore, if any desert tortoises are killed or injured during activities associated with this project component, Western and BLM must reinitiate consultation on the proposed action.

f. If one subadult or adult desert tortoises are killed or injured as a result of any indirect effect from translocation over the life of the project, Western and BLM must reinitiate consultation on the proposed action.

g. If more than 10 subadult or adult desert tortoises are identified for translocation during clearance surveys of the nonlinear project components, Western and BLM must reinitiate consultation on the proposed action. As described above, the identification of more than this number of subadult or adult desert tortoises would also indicate that the anticipated level of take of juveniles and eggs would also be exceeded, requiring reinitiation of consultation. This term and condition only applies to clearance of the project sites for construction and does not apply to the short distance movement of desert tortoises out of harm's way during activities that occur along the linear components.

2. The following term and condition implements reasonable and prudent measure 2:

Desert tortoises that are determined to be sick or injured may be relocated to an appropriate facility outside the State of California only with CDFG's prior written consent. The applicant shall submit to CDFG a written request indicating the number of desert tortoises to be relocated, the reason for relocating them (i.e., the nature of the disease or injury), the proposed facility to which the desert tortoises will be relocated, and the date on which they are proposed to be relocated. CDFG will provide a written response to each such request indicating, on a case-by-case basis, whether the relocation is authorized.

REPORTING REQUIREMENTS

Within 60 days of the completion of construction of the proposed action, Western, BLM, and applicant must provide a report to the Service that provides details on the effects of the action on the desert tortoise. Western, BLM, and the applicant must also provide an annual report by February 1 of each year during construction of the project and during the post-construction translocation monitoring. Specifically, these reports must include information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and

any actions undertaken to prevent similar incidents from reoccurring. In addition, these reports should provide detailed information on the results of translocation monitoring, if necessary, including the following: 1) location of all transmittered desert tortoises; 2) mortality rate from each of the translocated, resident, and control populations; 3) statistical analysis of differences in the mortality rates among all three populations; and 4) the health status and body condition of all transmittered desert tortoises.

We request that Western and BLM provide us with any recommendations that would facilitate the implementation of the conservation measures while ensuring protection of the desert tortoise. We also request that Western and BLM provide us with the names of any Biological Monitors who assisted the Authorized Biologist and an evaluation of the experience they gained on the project and the Service qualifications form filled out for this project (available at http://www.fws.gov/ventura/sppinfo/protocols/deserttortoise_monitor-qualifications-statement.pdf), along with any narrative that would provide an appropriate level of information. This information would provide us with additional reference material in the event any of these individuals are proposed as potential Authorized Biologists for future projects.

DISPOSITION OF SICK, INJURED, OR DEAD SPECIMENS

The CFWO is to be notified immediately at 760-431-9440 if any desert tortoises are found sick, injured, or dead in the action area. Immediate notification means verbal (if possible) and written notice within 1 workday, and must include the date, time, and location of the carcass, and any other pertinent information. Care must be taken in handling sick or injured individuals to ensure effective treatment and care can be administered, and in handling dead specimens to preserve biological material in the best possible state.

The CFWO should also be notified immediately at 760-431-9440 if any endangered or threatened species not addressed in this biological opinion is located in the project areas during the permit period. The same reporting requirements also shall pertain to any healthy individual(s) of any threatened or endangered species located in the action area that requires handling to move the individual(s) out of harm's way.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that Western and BLM work with the applicant and the Service to determine if the translocated, resident, and control desert tortoises attributed to the post-translocation monitoring program can be used to resolve additional research questions related to translocation and/or desert tortoise biology and ecology.

2. We recommend that the BLM amend the CDCA plan to prohibit additional renewable energy development (i.e., utility-scale solar and wind energy facilities) within WHMAs designated for wildlife habitat and population connectivity. In addition, solar energy projects proposing to use power tower technology should be excluded within 40.2 to 48.3 km (25 to 30 mi) of the Colorado River to ensure impacts to trust resources, such as migratory birds and golden eagles, are avoided in the future (J. Pagel and G. Hund, Service, pers. comm. 2011). This recommendation is also intended to protect the desert tortoise linkages within and between in the recovery unit(s).

REINITIATION NOTICE

This concludes formal consultation on the Western's proposal to issue a generation interconnection and BLM's proposal to issue a ROW grant to Rice Solar Reserve, LLC for the construction of the Rice Solar Energy Project and associated gen-tie in Riverside County, California. As outlined in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of take specified in the incidental take statement is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this biological opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action.

Sincerely,

Jim A. Bartel
Field Supervisor

Enclosure

cc:
Rick York, California Energy Commission, Sacramento, California
Magdalena Rodriguez, California Department of Fish and Game, Ontario, California
James Munson, Environmental Protection Agency, San Francisco, California
John Kalish, Bureau of Land Management, Palm Springs, California

LITERATURE CITED

Abella, S.R. 2010. Disturbance and plant succession in the Mojave and Sonoran deserts of the American Southwest. International Journal of Environmental Research and Public Health 7:1248-1284.

Averill-Murray, R.C. 2002. Effects on survival of desert tortoises (*Gopherus agassizii*) urinating during handling. Chelonian Conservation and Biology 4:430-435.

Averill-Murray, R.C. 2010. Electronic mail: Sample size needed to be 95 percent confident of detecting a 5 percent disease prevalence in resident populations. Dated October 1, 2010. Desert Tortoise Recovery Office, Reno, Nevada.

Averill-Murray, R.C. and A. Averill-Murray. 2005. Regional-scale estimation of density and habitat use of the desert tortoise (*Gopherus agassizii*) in Arizona. Journal of Herpetology 39:65-72.

Berry, K.H. 1974. Desert tortoise relocation project: Status report for 1972. California Department of Transportation.

Berry, K.H. 1986. Desert tortoise (*Gopherus agassizii*) relocation: Implications of social behavior and movements. Herpetologica 42:113-125.

Berry, K.H. 1999. Preliminary report from the 1999 spring survey of the desert tortoise long-term study plot in Chemehuevi Valley and Wash, California. Box Springs Field Station, Western Ecological Research Center, U.S. Geological Survey, Riverside, California.

Berry, K.H. 2003. Declining trends in desert tortoise populations at long-term study plots in California between 1979 and 2002: Multiple issues. Desert Tortoise Council Symposium. Abstract.

Bjurlin, C.D., and J.A. Bissonette. 2004. Survival during early life stages of the desert tortoise (*Gopherus agassizii*) in the South-Central Mojave Desert. Journal of Herpetology 38(4): 527-535.

Black, J.H. 1976. Observations on courtship behavior of the desert tortoise. Great Basin Naturalist 36:467-470.

Blythe, A. K., D. E. Swann, R. J. Steidl, and E. W. Stitt. 2003. Movement patterns of translocated desert tortoises. Proceeding of the 2003 Desert Tortoise Council Symposium.

Boarman, W.I. 2002. Threats to desert tortoise populations: A critical review of the literature. U.S. Geological Survey, Western Ecological Research Center, Sacramento, California.

Boarman, W.I., and M. Sazaki. 2006. A highway's road-effect zone for desert tortoises (*Gopherus agassizii*). Journal of Arid Environments 65:94-101.

Bowles, A.E., E. Eckert, L. Starke, E. Berg, L. Wolski, and J. Matesic, Jr. 1999. Effects of flight noise from jet aircraft and sonic booms on hearing, behavior, heart rate, and oxygen consumption of desert tortoise (*Gopherus agassizii*). AFRL-HE-WP-TR-1999-0170. Sea World Research Institute, Hubbs Marine Research Center, San Diego, California.

Britten, H.B., B.R. Riddle, P.F. Brussard, R. Marlow, and T.E. Lee. 1997. Genetic delineation of management units for the desert tortoise, *Gopherus agassizii*, in northeastern Mojave Desert. Copeia 1997:523-530.

Brooks, M. L., T. C. Esque, and J. R. Matchett. 2003. Current status and management of alien plants and fire in desert tortoise habitat. Proceedings of the 2003 Desert Tortoise Council Symposium.

Bureau of Land Management (BLM). 1986. Desert Tortoise [occurrence 13]. California Department of Fish and Game. Biogeographic Information and Observation System (BIOS). Retrieved August 24, 2009 from: http://bios.dfg.ca.gov.

Bureau of Land Management (BLM). 1990. Draft raven management plan for the California Desert Conservation Area. Prepared by Bureau of Land Management, California Desert District, Riverside, California.

Bureau of Land Management (BLM). 1999. The California Desert Conservation Area Plan 1980, as amended. U.S. Department of the Interior, Bureau of Land Management, California.

Bureau of Land Management (BLM). 2002. Northern and Eastern Colorado Desert coordinated management plan, an amendment of the 1980 Bureau of Land Management California Desert Conservation Area Plan. Bureau of Land Management, California Desert District, Moreno Valley, California.

Bureau of Land Management (BLM). 2011. Desert Sunlight Solar Farm Project California Desert Conservation Area Plan Amendment and Final Environmental Impact Statement. Palm Springs-South Coast Field Office, Palm Springs, California.

Bureau of Land Management and Department of Energy (BLM and DOE). 2010. Draft programmatic environmental impact statement for solar energy development in six southwestern states. Washington D.C.

Bunn, D., A. Mummert, R. Anderson, K. Gilardi, M. Hoshovsky, S. Shanks, and K. Stahle. 2006. California Wildlife: Conservation Challenges (California's Wildlife Action Plan). Prepared for the California Department of Fish and Game by the Wildlife Health Center, University of California, Davis.

Bury, R.B. 1987. Off-road vehicles reduce tortoise numbers and well-being. U.S. Department of the Interior, Fish and Wildlife Service, National Ecology Research Center, Fort Collins, Colorado. Research Information Bulletin Number 87-6.

Bury, R. B., R. A. Luckenbach, and S. D. Busak. 1977. Effects of off-road vehicles on vertebrates in the California desert. U. S. Department of the Interior, Wildlife Research Report 8, Washington, D.C.

Bury, R. B., T. C. Esque, L. A. DeFalco, and P. A. Medica. 1994. Distribution, habitat limitations, and protection of desert tortoises (*Gopherus agassizii*) in the eastern Mojave Desert. *In* R.B. Bury and D.J. Germano (eds.), Biology of North American Tortoises. Fish and Wildlife Service, North American Fauna Series.

California Energy Commission. 2010a. Draft environmental impact statement/staff assessment for the Solar Reserve LLC Rice Solar Energy Project. Sacramento, California.

California Energy Commission. 2010b. Rice Solar Energy Project commission decision. Sacramento, California.

CH2M HILL, Inc. 2009. Presence/absence surveys for the desert tortoise (*Gopherus agassizii*) on the proposed Rice Solar Energy Project. Report prepared by Sundance Biology, Inc., Paso Robles, California.

CH2M HILL, Inc. 2010a. Draft desert tortoise relocation/translocation plan for the Rice Solar Energy Project. Report prepared by Sundance Biology, Inc. Paso Robles, California.

CH2M HILL, Inc. 2010b. Draft raven management plan for the Rice Solar Energy Project. Report prepared by Sundance Biology, Inc. Paso Robles, California.

Cook, J.C., A.E. Weber, G.R. Stewart. 1978. Survival of captive tortoises released in California. Proceedings of the Desert Tortoise Council Symposium 1977:130-135.

Drake, K. K., T. C. Esque, K. E. Nussear, B. M. Jacobs, K. M. Nolte, and P. A. Medica. 2009. An annual report for the Fort Irwin desert tortoise translocation project; 2009 progress. Prepared for U.S. Army National Training Center, Directorate of Public Works. U.S. Geological Survey, Las Vegas Field Station, Henderson, Nevada.

Duda, J.J., A.J. Krzysik, and J.E. Freilich. 1999. Effects of drought on desert tortoise movement and activity. Journal of Wildlife Management 63:1181-1192.

Edwards, T., C.S. Goldberg, M.E. Kaplan, C.R. Schwalbe, and D.E. Swann. 2004a. Implications of anthropogenic landscape change on inter-population movements of the desert tortoise (*Gopherus agassizii*). Conservation Genetics 5:485-499.

Edwards, T., E.W. Stitt, C.R. Schwalbe, and D.E. Swann. 2004b. *Gopherus agassizii* (desert tortoise) movement. Herpetological Review 35:381-382.

Ernst, C.H., R.W. Barbour, and J.E. Lovich. 1994. Turtles of the United States and Canada. Smithsonian, Washington, D.C.

Esque, T. C., K. E. Nussear, K. K. Drake, A. D. Walde, K. H. Berry, R. C. Averill-Murray, A. P. Woodman, W. I. Boarman, P. A. Medica, J. Mack, and J. S. Heaton. 2010. Effects of subsidized predator, resource variability, and human population density on desert tortoise populations in the Mojave Desert. Endangered Species Research 12:167–177.

Evans, R. 2001. Free-roaming dog issues at the United States Marine Corps Air Ground Combat Center, Twentynine Palms, California. Proceedings of the 2001 Desert Tortoise Council Symposium.

Field, K.J., C.R. Tracy, P.A. Medica, R.W. Marlow, and P.S. Corn. 2007. Return to the wild: translocation as a tool in conservation of the desert tortoise (*Gopherus agassizii*). Biological Conservation 136:232-245.

Freeman, P. 2009. Abandoned and little-known airfields. Available at: http://www.airfields-freeman.com/CA/Airfields_CA_SanBernardino_SE.htm#3. Accessed June 2009.

Germano, D.J. 1994. Comparative life histories of North American tortoises. Pages 175-185 *in* R.B. Bury and D.J. Germano (eds.), Biology of North American tortoises. National Biological Survey, Fish and Wildlife Research 13, Washington, D.C.

Germano, D.J., R.B. Bury, T.C. Esque, T.H. Fritts, and P.A. Medica. 1994. Range and habitat of the desert tortoise. Pages 57-72 *in* R.B. Bury and D.J. Germano (eds.), Biology of the North American Tortoises. National Biological Survey, Fish and Wildlife Research 13, Washington, D.C.

Hagerty, B.E. 2008. Ecological genetics of the Mojave Desert tortoise. Ph.D. Dissertation. University of Nevada, Reno.

Hagerty, B.E., and C.R. Tracy. 2010. Defining population structure for the Mojave desert tortoise. Conservation Genetics. DOI 10.1007/s10592-010-0073-0.

Hagerty, B.E., K.E. Nussear, T.C. Esque, and C.R. Tracy. 2010. Making molehills out of mountains: landscape genetics of the Mojave desert tortoise. Landscape Ecology. DOI 10.1007/s10980-010-9550-6.

Harless, M.L., A.D. Walde, D.K. Delaney, L.L. Pater, and W.K. Hayes. 2009. Home range, spatial overlap, and burrow use of the desert tortoise in the West Mojave Desert. Copeia 2009:378-389.

Henen, B.T. 1997. Seasonal and annual energy budgets of female desert tortoises (*Gopherus agassizii*). Ecology 78:283-296.

Henen, B.T., C.D. Peterson, I.R. Wallis, K.H. Berry, and K.A. Nagy. 1998. Effects of climatic variation on field metabolism and water relations of desert tortoises. Oecologia 117:365-373.

Lovich, J.E., and D. Bainbridge. 1999. Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration. Environmental Management 249:309-326.

Luckenbach, R.A. 1982. Ecology and management of the desert tortoise *(Gopherus agassizii)* in California. *In* R.B. Bury (ed.). North American tortoises: Conservation and ecology. U.S. Fish and Wildlife Service, Wildlife Research Report 12, Washington, D.C.

Luke, C., A. Karl, and P. Garcia. 1991. A status review of the desert tortoise. Biosystems Analysis, Inc., Tiburon, California.

MacArthur, R. and E.O. Wilson. 1967. The theory of island biogeography. Princeton University Press, Princeton, New Jersey.

Marshall, R.M., S. Anderson, M. Batcher, P. Connor, S. Cornelius, R. Cox, A. Gondor, D. Gori, J. Humke, R. Paredes Aguilar, I.E. Parra, and S. Schwartz. 2000. An ecological analysis of conservation priorities in the Sonoran Desert ecoregion. Prepared by The Nature Conservancy Arizona Chapter, Sonoran Institute, and Institutio del Medio Ambiente y Desarrollo Sustentable del Estado de Sonora with support from Department of Defense Legacy Program, Agency and Institutional Partners.

McLuckie, A.M., and R.A. Fridell. 2002. Reproduction in a desert tortoise population on the Beaver Dam Slope, Washington County, Utah. Chelonian Conservation and Biology 4:288-294.

McLuckie, A.M., D.L. Harstad, J.W. Marr, and R.A. Fridell. 2002. Regional desert tortoise monitoring in the Upper Virgin River Recovery Unit, Washington County, Utah. Chelonian Conservation and Biology 4:380-386.

Mueller, J.M., K.R. Sharp, K.K. Zander, D.L. Rakestraw, K.R. Rautenstrauch, and P.E. Lederle. 1998. Size-specific fecundity of the desert tortoise (*Gopherus agassizii*). Journal of Herpetology 32:313-319.

Murphy, R.W., K.H. Berry, T. Edwards, and A.M. McLuckie. 2007. A genetic assessment of the recovery units for the Mojave population of the desert tortoise, *Gopherus agassizii*. Chelonian Conservation and Biology 6:229-251.

Nagy, K.A., and P.A. Medica. 1986. Physiological ecology of desert tortoises. Herpetologica 42:73-92.

Nicholson, L. 1978. The effects of roads on desert tortoise populations. Pages 127-129 *in* M. Trotter and C.G. Jackson, Jr. (eds.). Desert Tortoise Council Proceedings of 1978 Symposium.

Nussear, K.E. 2004. Mechanistic investigation of the distributional limits of the desert tortoise, *Gopherus agassizii*. Ph.D. Dissertation. University of Nevada, Reno.

Nussear, K.E., T.C. Esque, R.D. Inman, L. Gass, K.A. Thomas, C.S.A. Wallace, J.B. Blainey, D.M. Miller, and R.H. Webb. 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran deserts of California, Nevada, Utah, and Arizona. U.S. Geological Survey Open-file Report 2009-1102. 18 pp.

O'Connor, M.P., J.S. Grumbles, R.H. George, L.C. Zimmerman, and J. R. Spotila. 1994. Potential hematological and biochemical indicators of stress in free-ranging desert tortoises, *Gopherus agassizii*, in the eastern Mojave desert. Herpetological Monographs 8:60-71.

Peterson, C.C. 1996a. Ecological energetics of the desert tortoise (*Gopherus agassizii*): Effects of rainfall and drought. Ecology 77:1831-1844.

Peterson, C.C. 1996b. Anhomeostasis: Seasonal water and solute relations in two populations of the threatened desert tortoise (*Gopherus agassizii*) during chronic drought. Physiological Zoology 69:1324-1358.

Rakestraw, D.L. 1997. Desert tortoise relocation at Yucca Mountain, Nevada. Abstract of paper presented at the 1997 Annual Meeting and Symposium of the Desert Tortoise Council.

Randall, J. M., S.S. Parker, J. Moore, B. Cohen, L. Crane, B. Christian, D. Cameron, J. MacKenzie, K. Klausmeyer and S. Morrison. 2010. Mojave Desert Ecoregional Assessment. Unpublished Report. The Nature Conservancy, San Francisco, California. Available at: http://conserveonline.org/workspaces/mojave/documents/mojave-desert-ecoregional-2010/@@view.html.

Rostal, D.C., V.A. Lance, J.S. Grumbles, and A.C. Alberts. 1994. Seasonal reproductive cycle of the desert tortoise (*Gopherus agassizii*) in the eastern Mojave Desert. Herpetological Monographs 8:72-82.

Saethre, M.B., T.C. Esque, P.A. Medica, R. Marlow, and C.R. Tracy. 2003. Determining carrying capacity of desert tortoises. Abstract of a paper present at the 28th annual meeting and symposium of the Desert Tortoise Council.

Stephens, P.A., W.J. Sutherland, and R.P. Freckleton. 1999. What is the allee effect? Oikos 87:185-190.

Stitt, E.W., C.R. Schwalbe, D.E. Swann, R.C. Averill-Murray, and A.K. Blythe. 2003. Sonoran desert tortoise ecology and management: Effects of land use change and urbanization on desert tortoises. Final report to Saguaro National Park.

Tracy, C.R., R.C. Averill-Murray, W.I. Boarman, D. Delehanty, J.S. Heaton, E.D. McCoy, D.J. Morafka, K.E. Nussear, B.E. Hagerty, and P.A. Medica. 2004. Desert tortoise recovery plan assessment. Report to the U.S. Fish and Wildlife Service, Reno, Nevada.

Turner, F.B., P.A. Medica, and C.L. Lyons. 1984. Reproduction and survival of the desert tortoise (*Scaptochelys agassizii*) in Ivanpah Valley, California. Copeia 4:811-820.

Turner, F.B., P. Hayden, B.L. Burge, and J.B. Roberson. 1986. Egg production by the desert tortoise (*Gopherus agassizii*) in California. Herpetologica 42:93-104.

Turner, F.B., K.H. Berry, D.C. Randall, and G.C. White. 1987. Population ecology of the desert tortoise at Goffs, California, 1983-1986. Report to Southern California Edison Co., Rosemead, California.

U.S. Army. 2009. Fort Irwin annual permit report for 2008. Submitted to the Desert Tortoise Recovery Office, Reno, Nevada. Fort Irwin, California.

U.S. Army. 2010. 2009 Annual reports for Fort Irwin biological opinions and desert tortoise permit for the Fort Irwin translocation project. Submitted to the Desert Tortoise Recovery Office, Reno, Nevada. Fort Irwin, California.

U.S. Fish and Wildlife Service (Service). 1980. Endangered and threatened wildlife and plants; listing as threatened with critical habitat for the Beaver Dam Slope populations of the desert tortoise in Utah. Federal Register 45:55654-55666.

U.S. Fish and Wildlife Service (Service). 1989. Endangered and threatened wildlife and plants; emergency determination of endangered status for the Mojave population of the desert tortoise. Federal Register 54:32326-32331.

U.S. Fish and Wildlife Service (Service). 1990. Endangered and threatened wildlife and plants; Determination of threatened status for the Mojave population of the desert tortoise; Final rule. Federal Register 55:12178-12191.

U.S. Fish and Wildlife Service (Service). 1994a. Desert tortoise (Mojave population) recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon.

U.S. Fish and Wildlife Service (Service). 1994b. Endangered and threatened wildlife and plants; Determination of critical habitat for the Mojave population of the desert tortoise; Final rule. Federal Register 59:5820-5866.

U.S. Fish and Wildlife Service (Service). 2005. Guidance on conducting Endangered Species Act (ESA) section 7 consultations on the desert tortoise and other species. Memorandum from the Assistant Manager, Ecological Services, California Nevada Operations Office. Sacramento, California.

U.S. Fish and Wildlife Service (Service). 2006. Range-wide monitoring of the Mojave population of the desert tortoise: 2001-2005 summary report. Desert Tortoise Recovery Office, Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2008. Draft revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). California and Nevada Region, Sacramento, California.

U.S. Fish and Wildlife Service (Service). 2009a. Desert tortoise (Mojave population) field manual (*Gopherus agassizii*). Region 8, Sacramento, California.

U.S. Fish and Wildlife Service (Service). 2009b. Range-wide monitoring of the Mojave population of the desert tortoise: 2007 annual report. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2010a. Translocation of desert tortoise (Mojave population) from project sites: Plan development guidance. August 2010. Desert Tortoise Recovery Office, Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2010b. Preparing for any action that may occur within the range of the Mojave desert tortoise (*Gopherus agassizii*). 2010 Field Season. Desert Tortoise Recovery Office, Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2010c. Reinitiation of Endangered Species Act consultation on the effects of the California Desert Conservation Area Plan Amendment for the Coachella Valley, Riverside County, California (FWS-ERIV-10B0278-10F0649). Carlsbad, California.

U.S. Fish and Wildlife Service (Service). 2010d. Mojave population of the desert tortoise (*Gopherus agassizii*), 5-year Review: Summary and evaluation. Desert Tortoise Recovery Office, Reno, Nevada.

U.S. Fish and Wildlife Service (Service). 2011. Biological opinion for the Palen Solar Power Project, Riverside County, California. Carlsbad Fish and Wildlife Office, Carlsbad, California.

U.S. Fish and Wildlife Service and National Marine Fisheries Service (Service and NMFS). 1986. Preamble to implementation regulations for interagency cooperation. 50 CFR Part 402. Federal Register 51:19932.

U.S. Fish and Wildlife Service and National Marine Fisheries Service (Service and NMFS). 1998. Endangered species consultation handbook available at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

Vasek, F. C., H. B. Johnson, and D. H. Eslinger. 1975. Effects of pipeline construction on creosote bush scrub vegetation of the Mojave Desert. Madroño 23:1-13.

Walde, A.D., A.P. Woodman, and W.I. Boarman. 2008. Desert tortoise surveys and research in the southern and western expansion areas of Fort Irwin. 2008 summary report. ITS Corporation. Report prepared for the Department of the Army. Fort Irwin, California.

Wallis, I.R., B.T. Henen, and K.A. Nagy. 1999. Egg size and annual egg production by female desert tortoises (*Gopherus agassizii*): The importance of food abundance, body size, and date of egg shelling. Journal of Herpetology 33:394-408.

Webb, R.H. 2002. Recovery of severely compacted soils in the Mojave Desert, California, USA. Arid Land Research and Management 16: 291-305.

Western Area Power Administration (Western). 2011a. Biological assessment for the Rice Solar Energy Project. Report prepared with technical assistance from Solar Reserve and CH2M HILL.

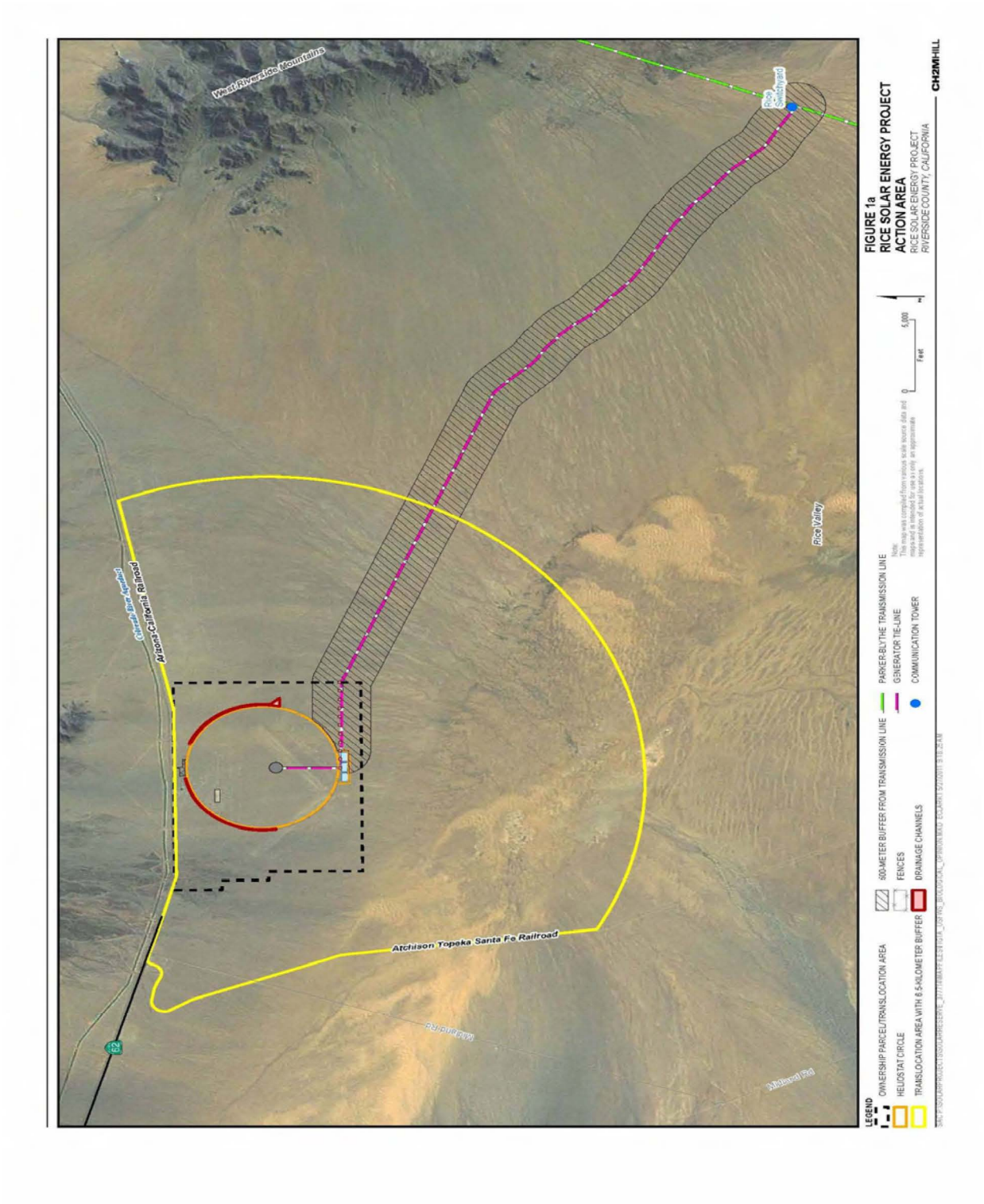
Western Area Power Administration (Western). 2011b. Electronic mail: Supplemental information on the telecommunications component. Northstar-Technology Corp. Phoenix, Arizona.

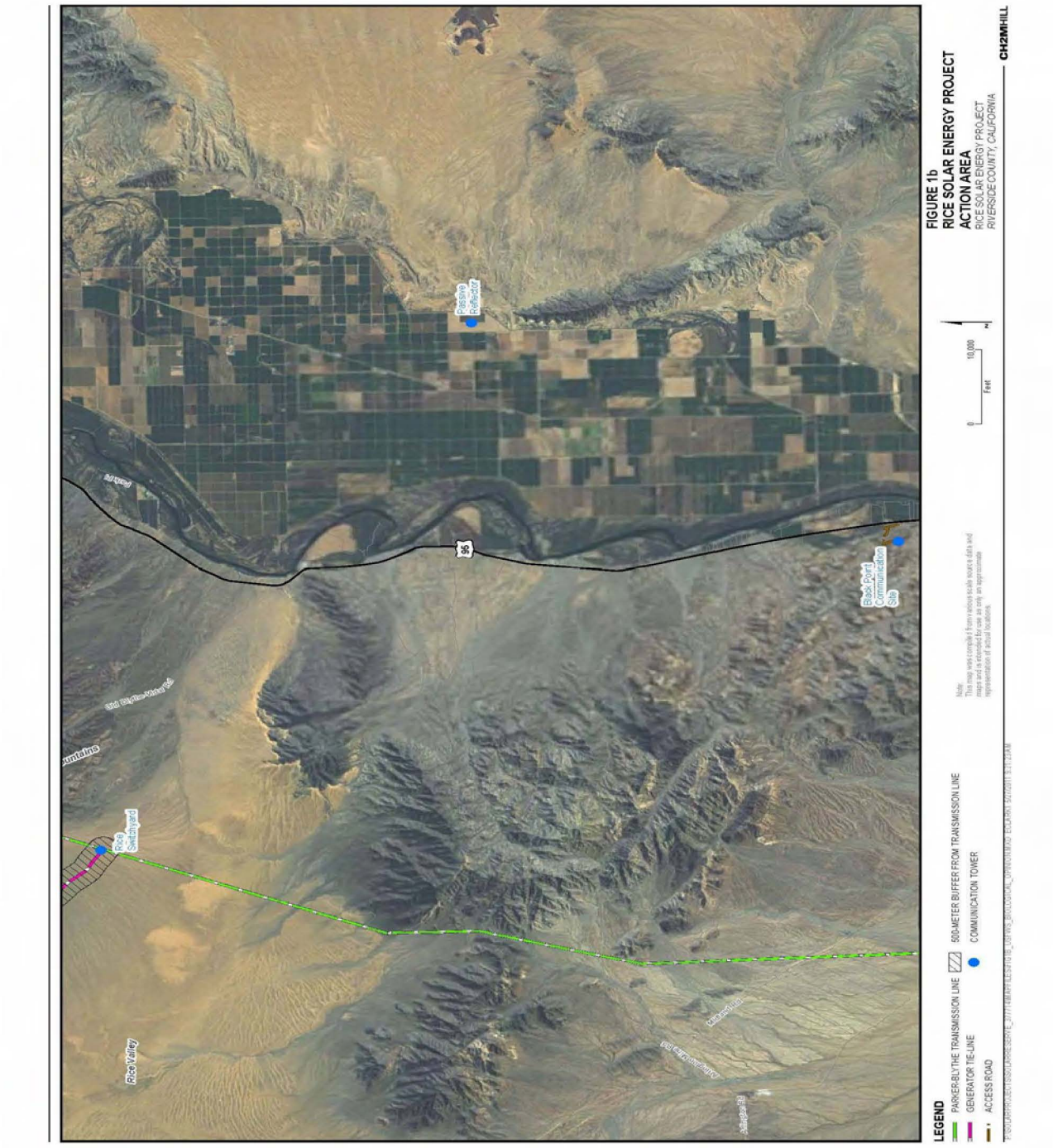
Personal Communications

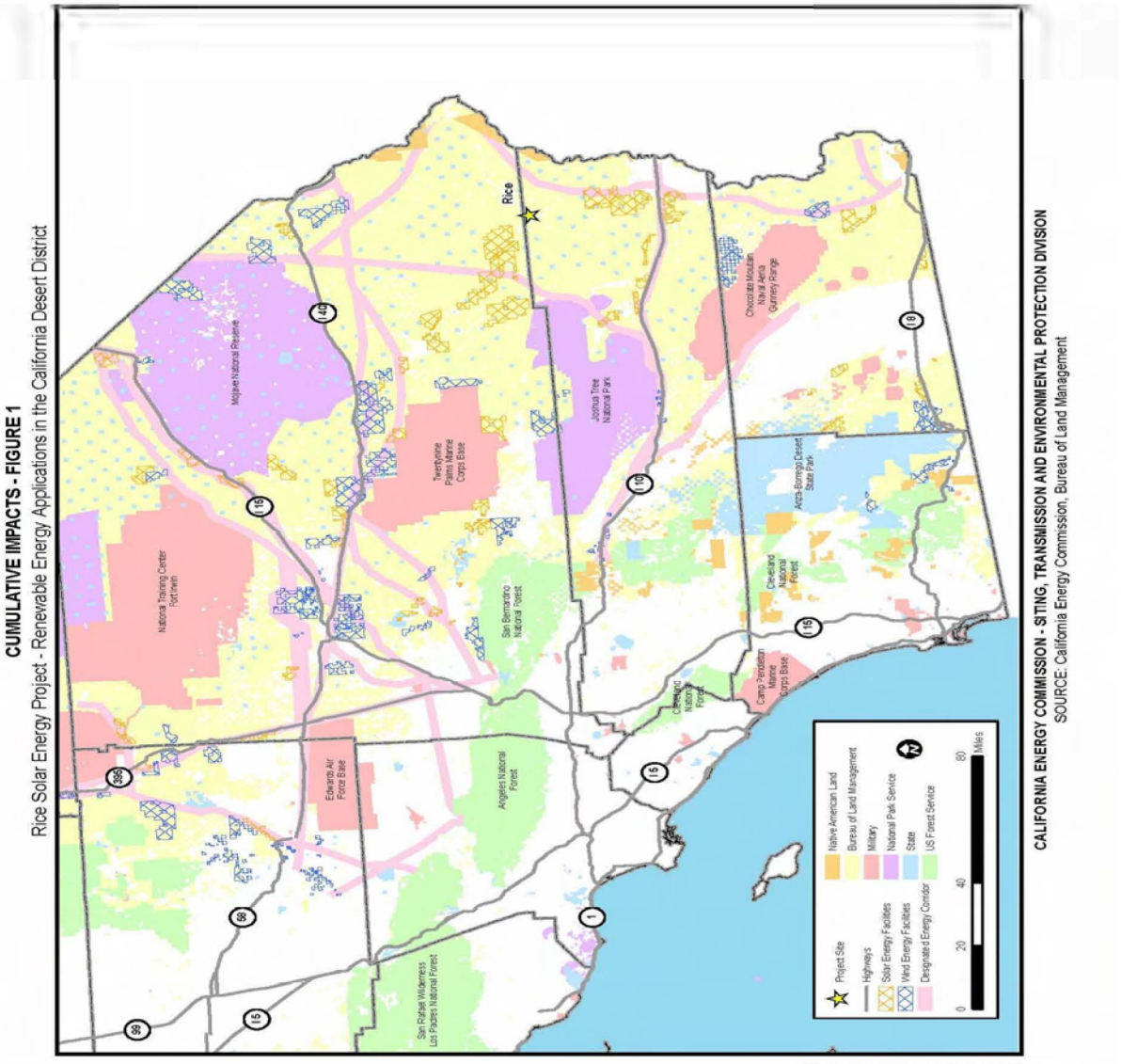
Massar, Mark. 2011. Bureau of Land Management, Palm Springs-South Coast Field Office. Palm Springs, California.

Pagel, Joel, and Gary Hund. 2011. U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, Carlsbad, California.

APPENDIX 1
FIGURES and TABLES not included in the text




Passive Reflector
Rice Switchyard
Rice Valley
Black Point Communication Site
LEGEND
PARKER-BLYTHE TRANSMISSION LINE
GENERATOR TIE-LINE
ACCESS ROAD
500-METER BUFFER FROM TRANSMISSION LINE
COMMUNICATION TOWER
0
10,000
Feet
FIGURE 1b
RICE SOLAR ENERGY PROJECT
ACTION AREA
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA
CH2MHILL


CUMULATIVE IMPACTS - FIGURE 1
Rice Solar Energy Project - Renewable Energy Applications in the California Desert District
Rice
Mojave National Preserve
Twentynine Palms Marine Corps Base
Joshua Tree National Park
Chocolate Mountain Naval Aerial Gunnery Range
National Training Center Fort Irwin
San Bernardino National Forest
Anza-Borrego Desert State Park
Cleveland National Forest
Camp Pendleton Marine Corps Base
Edwards Air Force Base
Angeles National Forest
San Rafael Wilderness Los Padres National Forest
Native American Land
Bureau of Land Management
Military
National Park Service
State
US Forest Service
Project Site
Highways
Solar Energy Facilities
Wind Energy Facilities
Designated Energy Corridor
0
20
40
60
Miles
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: California Energy Commission, Bureau of Land Management
CUMULATIVE IMPACTS

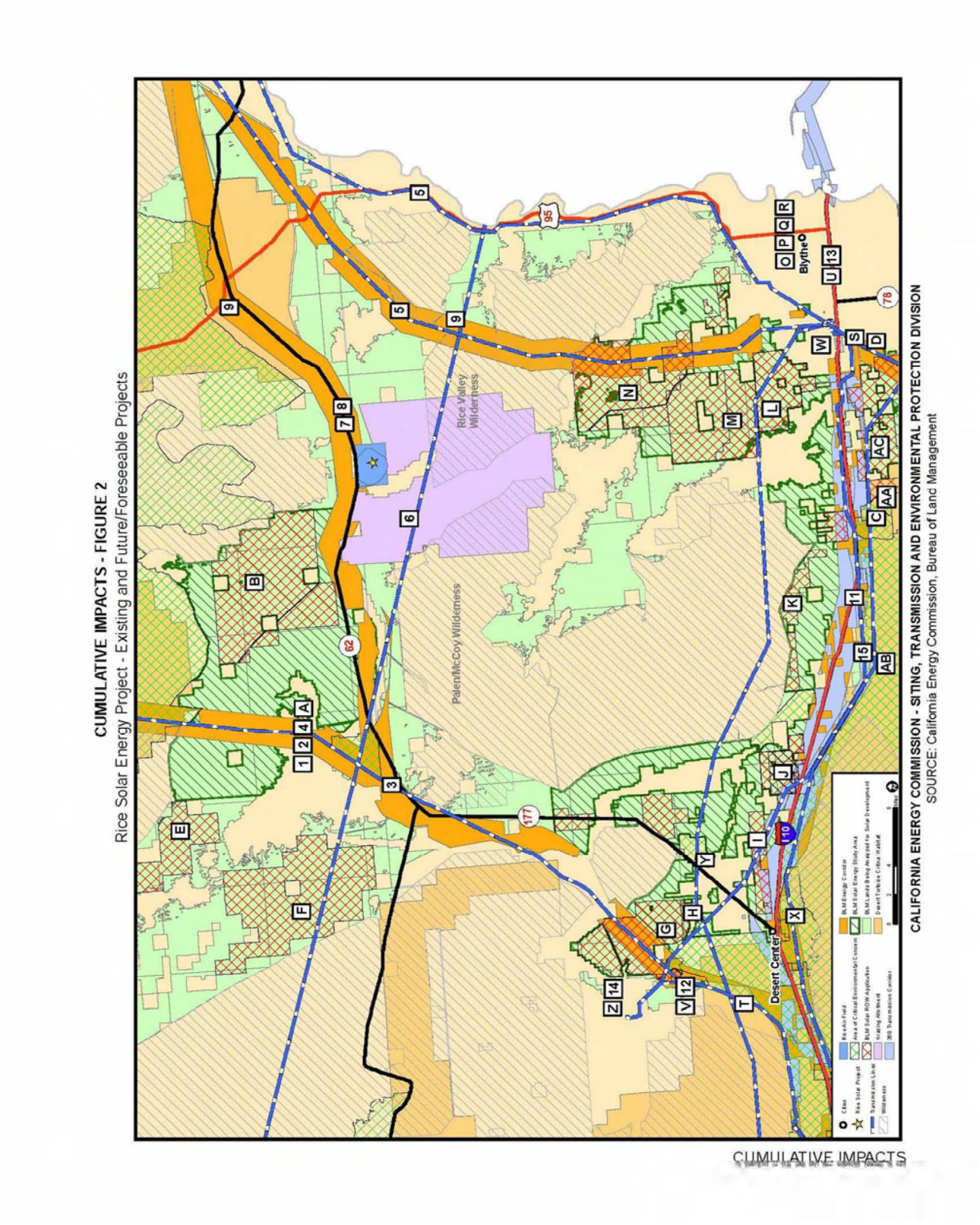

CUMULATIVE IMPACTS - FIGURE 2
Rice Solar Energy Project - Existing and Future/Foreseeable Projects
CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: California Energy Commission, Bureau of Land Management
Rice Valley Wilderness
Palen/McCoy Wilderness
Blythe
Desert Center
CUMULATIVE IMPACTS

Table 1B. Renewable Energy Projects on State and Private Lands in California		
Project	**Location**	**Status**
Alta-Oak Creek Mojave Project (up to 800 MW)	Kern County, west of Mojave	Under environmental review
Granite Wind, LLC (81 MW)	San Bernardino	EIR/EIS in progress
Hatchet Ridge Wind Project	Shasta County, Burney	Under construction
Iberdrola Tule Wind (200 MW)	San Diego County, McCain Valley	EIR/EIS in progress
Lompoc Wind Energy Project	Lompoc, Santa Barbara County	Approved
Pacific Wind (Iberdrola)	McCain Valley, San Diego County	Under environmental review
PdV Wind Energy Project (up to 300 MW)	Kern County, Tehachapi Mountains	Approved
Solano Wind Project Phase 3 (up to 128 MW)	Montezuma Hills, Solano County	Under environmental review
TelStar Energies, LLC (300 MW)	Ocotillo Wells, Imperial County	Under environmental review
Geothermal Projects		
Buckeye Development Project	Geyserville, Sonoma	Under environmental review

Table 2. Existing Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
Existing Projects in the Rice Valley area within 15-20 miles of proposed project						
1	Iron Mountain Pumping Plant	Iron Mountain Pump Plant Road, ~18 miles northwest of Rice project	Metropolitan Water District of Southern California	Existing	N/A	Iron Mountain Pump Plant is part of the Metropolitan Water District of Southern California's facilities and houses the pumping plant, holding ponds, a small residential area and a portion of the Colorado River aqueduct itself. Ongoing Operation and Maintenance activities occur frequently and will continue throughout the life of the Pump Plant.
2	Iron Mountain Pump Plant Airport - Private	Iron Mountain Pump Plant Road, ~18 miles northwest of Rice project	Metropolitan Water District of Southern California	Existing	N/A	Privately owned and operating airport 18 miles northwest of the proposed Rice Solar Energy project.
3	Metropolitan Water District 230-kV Transmission Line	Riverside County, San Bernardino County,~18 miles west of the proposed Rice project	Metropolitan Water District	Existing	N/A	Metropolitan Water District's 230-kV line running in a north-south direction from Camino Substation near Needles Freeway (Hwy 40) in San Bernardino County south to Eagle Mountain Substation in Riverside County.

Table 2. Existing Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
4	Iron Mountain Substation	San Bernardino County, ~18 miles northwest of the proposed project	Metropolitan Water District	Existing	N/A	Metropolitan Water District's Iron Mountain Substation located approximately 18 miles northwest of the proposed Rice Solar Energy Project.
5	Western Area Power Administration 161-kV Transmission Lines (2)	Two existing lines in eastern Riverside County, ~12 and ~20 miles east of proposed project.	Western Area Power Administration (WAPA)	Existing	N/A	WAPA's two 161-kV transmission lines running in a north-south direction east of proposed Rice Solar Energy Project, both terminating near CA/AZ border near Lake Havasu.
6	Rice Valley Grazing Allotment	Rice Valley, surrounding Rice Solar Energy Project to east, south and west.	BLM	Existing	74,740	A 10-year grazing lease on the Rice Valley Grazing Allotment authorizes sheep grazing on public land. The allotment boundaries form a U-shape parcel surrounding the proposed project site. The eastern boundary begins at approximately 2 miles east of the site and extends for ~2 miles east; the western boundary begins at approximately 2 miles west of the site and extends ~4 miles west. The southern boundary begins ~1 mile south of the site and extends ~10 miles south.
7	Arizona-California Railroad	Runs from Cadiz, Ca to Parker, Az. A portion parallels State Route 62, immediately north of proposed Rice project.	RailAmerica	Existing	N/A	The Arizona-California railroad operates nearly 300 miles of rail encompassing 190 miles of rail from Cadiz, Ca to Matthie, Az, 57 miles from Matthie, Az to Pheonix, Az anda 50 mile branch extending from Rice, Ca to Ripley, Ca.
8	Colorado River Aqueduct	Runs parallel to State Route 62, immediately north of proposed Rice project.	Metropolitan Water District of Southern California	Existing	N/A	The aqueduct carries water 242 miles, from Lake Havasu, on the Colorado River, to Lake Matthews in western Riverside County.

Table 2. Existing Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
9	West-wide Section 368 Energy Corridors	Riverside County	BLM, DOE, U.S. Forest Service	Approved by BLM and U.S. Forest Service	N/A	Designation of corridors on federal land in the 11 western states, including California, for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors). One of the corridors runs along the southern portion of Riverside County.
10	Recreational Opportunities	Eastern Riverside County	BLM	Existing	N/A	BLM has numerous recreational opportunities on lands in eastern Riverside County and bordering eastern San Bernardino County, including Rice Valley Wilderness Area, Palen/McCoy Wilderness Area, the Turtle Mountains Wilderness Trail, Blythe-Vidal Old Road Trail, and Midland Long-Term Visitor Area.
Additional Existing Projects Outside 15-20 mile Boundary in Eastern Riverside County						
11	Interstate 10	Linear project running from Santa Monica to Blythe (in California)	Caltrans	Existing	N/A	Interstate 10 (I-10) is a major east-west route for trucks delivering goods to and from California. It is a four lane divided highway in the Blythe region.
12	Eagle Mountain Pumping Plant	Eagle Mountain Road, west of Desert Center	Metropolitan Water District of Southern California	Existing	N/A	144 ft. pumping plant that is part of the Metropolitan Water District of Southern California's facilities located approximately 40 miles southwest of the proposed Rice project.
13	Blythe Energy Project	City of Blythe, north of I-10, 7 miles west of the CA/AZ border	Blythe Energy, LLC	Existing	75	520 MW combined-cycle natural gas-fired electric-generating facility. Project is connected to the Buck Substation owned by WAPA.
14	Kaiser Mine	Eagle Mountain, north of Desert Center	Kaiser Ventures, Inc.	Mining activities stopped in 1983.	N/A	Kaiser Steel mined iron ore at Kaiser Mine in Eagle Mountain and provided much of the Pacific Coast steel in the 1950s. Mining project also included the Eagle Mountain Railroad, 51 miles long. Imported steel captured market share in the 1960s and 1970s and primary steelmaking closed in the 1980s.
15	Devers-Palo Verde Transmission Line	From the Midpoint Substation to Devers Substation	Southern California Edison	Existing	N/A	Existing 500 kV transmission line parallel to I-10 from Midpoint Substation, approximately 10 miles southwest of Blythe, to the SCE Devers Substation, near Palm Springs.

Table 3. Future Foreseeable Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
Future Foreseeable Projects in the Rice Valley area within 15-20 miles of proposed project						
A	Three Colorado River Aqueduct Rehabilitation Projects	Iron Mountain Pump Plant, ~18 miles northwest of proposed Rice project	Metropolitan Water District of Southern California	Under Construction	N/A	Metropolitan Water District of Southern California proposes to repair the delivery line expansion joints at the Iron Mountain Pumping Plant, located approximately 18 miles northwest of the proposed project. The work is scheduled to be complete February of 2011.
B	Ward Valley, Leopold Companies, Inc	San Bernardino County, ~5 miles northwest of proposed Rice project in the Ward Valley	Leopold Companies, Inc	Plan of Development in to Needles BLM	8,000	750 MW solar thermal power plant proposed in the Ward Valley approximately 5 miles northwest of the proposed Rice Solar Energy project.
Additional Future Foreseeable Projects Outside 15-20 mile Boundary in Eastern Riverside County						
C	Colorado River Substation	1.5 miles south of Interstate 10 and 4.75 miles east of Wileys Well Road	SCE		140	Expand the 500 kV switchyard, previously approved as part of the DPV2 CPCN on approximately 45 acres of land, into a full 500/220 kV substation on approximately 90 acres of land.
D	Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar (previously OptiSolar)	POD in to BLM	7,724	600 MW solar photovoltaic project located on 7,724 acres. Adjacent to DPV transmission line and SCE Colorado Substation. Approximately 27 AF would be used during construction and 3.8 AFY during operation.
E	Killbeck	26 miles northwest of proposed Rice project	Boulevard Associates	Plan of Development in to Needles BLM	12,046	1,000 MW solar thermal power plant located 26 miles northwest of proposed Rice project.
F	Cadiz Lake	26 miles west of proposed Rice project	Boulevard Associates	Plan of Development in to Needles BLM	35,639	1,000 MW solar thermal power plant located 26 miles west of proposed Rice project.

Table 3. Future Foreseeable Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
G	Desert Sunlight	35 miles southwest of proposed Rice project	First Solar	Undergoing environmental review	5,128	550 MW solar photovoltaic project located 6 miles north of Desert Center in eastern Riverside County. The project footprint is 4,410 acres and the BLM ROW application is for 5,128 acres. Project would tie into the SCE Red Bluff substation. Approximately water usage is; 27 AFY of during construction and 3.8 AFY during operation.
H	EnXco 1	36 miles southwest of proposed Rice project	EnXco Development LLC	Plan of Development in to Palm Springs BLM	1,327	300 MW solar thermal power plant located north of Desert Center.
I	Chuckwalla Solar I	35 miles southwest of proposed Rice project, 1 mile north of Desert Center	Chuckwalla Solar I, LLC	Plan of Development submitted to BLM	4,099	200 MW solar photovoltaic project on 4,099 acres of land. Project would be developed in several phases and would tap into an existing SCE 161-kV transmission line crossing the site.
J	Palen Solar Power Project	33 miles southwest of proposed Rice project, 10 miles east of Desert Center	Solar Millennium LLC/Chevron Energy	Undergoing environmental review, construction to begin end of 2010.	5,213	500 MW solar trough project on 5,213 acres. Facility would consist of two 250 MW plants. Approximately 3,870 acres would be disturbed. Project would include interconnection to the SCE Red Bluff Substation. Project would use 300 AFY of water.
K	Genesis Solar Energy Project	30 miles south of proposed Rice project, north of I-10, near Ford Dry Lake	NextEra (FPL)	Undergoing environmental review. Construction to begin at the end of 2010.	4,535	250 MW solar trough project located on 4,535 acres north of the Ford Dry Lake. Project includes six mile natural gas pipeline and a 5.5 mile gen-tie line to the Blythe Energy Center to Julian Hinds Transmission Line, and then travels east on shared transmission poles to the Colorado River Substation.
L	Blythe Solar Power Project	26 miles southeast of proposed Rice project	Solar Millennium LLC/Chevron Energy	Undergoing environmental review	9,481	1,000 MW solar trough facility on 9,481 acres
M	McCoy Project	20 miles south of proposed Rice project	EnXco development, LLC	Plan of Development in to Palm Springs BLM	20,608	250 MW solar trough project. ROW in process for monitoring water well drilling.
N	Big Maria Vista Solar Project	14 miles south of proposed Rice project	Bullfrog Green Energy	Plan of Development submitted to BLM	22,717	500 MW solar photovoltaic project, BLM ROW application is for 22,717 acres of land. Project would be built in three phases and would require 6,000 gallons of water monthly.

Table 3. Future Foreseeable Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
O	Four Commercial Projects	Blythe, CA	Various	Approved	N/A	Four commercial projects have been approved by the Blythe Planning Department including the Agate Road Boat & RV Storage, Riverway Ranch Specific Plan, Subway Restaurant and Motel, and Agate Senior Housing Development.
P	Intake Shell	Blythe, CA		Under Construction	N/A	Reconstruction of a Shell facility located at Intake & Hobsonway. Demolition occurred in 2008, reconstruction planned for 2009-2010.
Q	Eighteen Residential Developments	Blythe, CA	Various	Approved/Under Construction	N/A	Fifteen residential development projects have been approved by the Blythe Planning Department including: Vista Palo Verde (83 Single Family Residential [SFR]), Van Weelden (184 SFR), Sonora South (43 SFR), Ranchette Estates (20 SFR), Irvine Assets (107 SFR), Chanslor Village (79 SFR), St. Joseph's Investments (59 SFR), Edgewater Lane (SFR), The Chanslor Place Phase IV (57 SFR), Cottonwood Meadows (103 Attached SFR), Palo Verde Oasis Phase IV (29 SFR). Three residential development projects have been approved and are under construction including: The Chanslor Phase II & III (78 SFR), River Estate at Hidden Beaches, Mesa Bluffs Villas (26 Attached SFR).
R	Blythe PV Project	Blythe, CA	First Solar	CPUC approved project terms of a 20 year power purchase agreement for sale of 7.5 MW, Under construction in forth quarter, 2009	200	7.5 MW solar photovoltaic project located on 200 acres. Project was constructed by First Solar and sold to NRG Energy.
S	Blythe Energy Project Transmission Line	From the Blythe Energy Project (Blythe, CA) to Devers Substation	Blythe Energy, LLC	Under construction	N/A	Transmission Line Modifications including upgrades to Buck Substation, approximately 67.4 miles of new 230 kV transmission line between Buck Substation and Julian Hinds Substation, upgrades to the Julian Hinds Substation, installation of 6.7 miles of new 230 kV transmission line between Buck Substation and SCE's DPV 500 kV transmission line.
T	Green Energy Express Transmission Line Project	70-mile transmission line from the Eagle Mountain Substation to southern California	Green Energy Express LLC	September 9, 2009, Green Energy Express LLC filed a Petition for Declaratory Order requesting that FERC approve certain rate incentives for the project	N/A	70-mile double-circuit 500 kV transmission line and new 500/230 kV substation from near the Eagle Mountain Substation (eastern Riverside County) to Southern California

Table 3. Future Foreseeable Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
U	Blythe Energy Project II	Blythe, CA. Near the Blythe Airport and I-10	Blythe Energy, LLC	Approved December 2005	30 acres (located on Blythe Energy Project land)	520 MW combined-cycle power plant located entirely within the Blythe Energy Project site boundary. Blythe Energy Project II will interconnect with the Buck Substation constructed by WAPA as part of the Blythe Energy Project. Project is designed on 30 acres of a 76-acre site.
V	Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy Company	License application filed with FERC in June 2009	1,524	1,300 MW pumped storage project designed to store off-peak energy to utilize during on-peak hours. The captured off-peak energy will be used to pump water to an upper reservoir where the energy will be stored. The water will then be released to a lower reservoir through an underground electrical generating facility where the stored energy will be released back into the Southwestern grid during "high demand peak" times, primarily weekdays. Estimated water use is 8,100 AFY for the first four-year start-up period and replacement water is 1,763 AFY thereafter. 1
W	Blythe Airport Solar I Project	Blythe Airport, 31 miles south of proposed Rice Solar project	U.S. Solar	Application has been submitted to City of Blythe, City of Blythe approved the project in November, 2009	640	100 MW solar photovoltaic project located on 640 acres of Blythe airport land.
X	Red Bluff Substation	South of Desert Center	SCE		N/A	Proposed 230/500 kV Substation near Desert Center. Planned to interconnect renewable projects near Desert Center with the Devers-Palo Verde transmission line.
Y	Chuckwalla Valley Raceway	Desert Center Airport (no longer a functioning airport)	Developer Matt Johnson	Under construction, track expected to be open in mid 2010	400	Proposed 500-mile race track located on 400 acres of land that used to belong to Riverside County and was used as the Desert Center airport.

Table 3. Future Foreseeable Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
Z	Eagle Mountain Landfill Project	Eagle Mountain, North of Desert Center	Mine Reclamation Corporaton and Kaiser Eagle Mountair, Inc.	U.S. Court of Appeals for the Ninth Circuit issued its regarding the EIS for the project in 11/09 and ruled that the land exchange for the project was not properly approved by the administrative agency. Kaiser's Mine and Reclamation is considering all available options.	~ 3,500	The project proposed to develop the project on a portion of the Kaiser Eagle Mountain Mine in Riverside County, California. The proposed project comprises a Class III nonhazardous municipal solid waste landfill and the renovation and repopulation of Eagle Mountain Townsite. The proposal by the proponent includes a land exchange and application for rights-of-way with the Bureau of Land Management and a Specific Plan, General Plan Amendment, Change of Zone, Development Agreement, Revised Permit to Reclamation Plan, and Tentative Tract Map with the County. The Eagle Mountain landfill project is proposed to accept up to 20,000 tons of non-hazardous solid waste per day for 50 years.
AA	Wiley Well Communicatio n Tower (part of the Public Safety Enterprise Communicatio n System)	East of Wileys Well Road, just south of I-10	Riverside County	Final EIR for the Public Safety Enterprise Communication System published in August 2008.	N/A	The Public Safety Enterprise Communication project is the expansion of the County of Riverside's fire and law enforcement agencies approximately 20 communication sites to provide voice and data transmission capabilities to assigned personnel in the field.
AB	Desert Southwest Transmission Line	118 miles primarily parallel to DPV	Imperial Irrigation District	Final EIR prepared 2005. Approved by the BLM in 2006.	N/A	New, approximately 118-mile 500 kV transmission line from a new substation/switching station near the Blythe Energy Project to the existing Devers Substation located approximately 10 miles north of Palm Springs, California.
AC	Mule Mountain Solar Project	South of I-10, approximately 4 miles west of Blythe	Bullfrog Green Energy	Plan of Development in to Palm Springs BLM	2,684	500 MW solar concentrating photovoltaic project located on 2,684 acres. Considering interconnection with proposed SCE Colorado Substation. Approximately 6,000 gallons of water would be required monthly.
Additional Projects Outside Cumulative Figure Boundaries						

Table 3. Future Foreseeable Projects in the Rice Valley area and Eastern Riverside County

ID #	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve		In December 2009, Senator Feinstein introduced bill S.2921 that would designate two new national monuments including the Mojave Trails National Monument.	941,000 acres	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rock hounding.
	BLM Renewable Energy Study Areas	Northewest of Rice Solar project in San Bernardino County and along the I-10 corridor	BLM	Proposed	N/A	The DOE and BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar PEIS. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.
	Solar Energy projects along Arizona Border	Approximately 15 miles east of the CA/ AZ border along I-10 corridor	Various	Applications filed in to Arizona BLM field offices, application status listed as pending.	N/A	Five solar trough and solar power tower projects have been proposed along the I-10 corridor approximately 15 miles east of the CA/AZ border. The projects have been proposed on BLM administered-land in the Yuma and Kingman Field Offices and have requested use of approximately 75,000 acres.
	Paradise Valley "New Town" Development	Approximately 30 miles west of Desert Center (7 miles east of the city of Coachella)	Glorious Land Company	Notice of Preparation of an EIR published in December of 2005. Still under environmental review.	6,397	Company proposed to develop a planned community as an international resort destination with residential, recreational, commercial, and institutional uses and facilities. The project is planned as a self-contained community with all public and quasi-public services provided. The project is located outside the Coachella Valley Water District (CVWD) boundaries and the applicant has entered into an agreement with the CVWD to manage artificial recharge of the Shaver's Valley groundwater. The proponent has purchased a firm water supply from Rosedale-Rio Bravo Water District in Kern County. In-kind water will be transferred to the MWD which will release water from the Colorado River Aqueduct to a 38 acre percolation pond on the project site. The MWD will deliver approximately 10,000 AFY to the percolation pond and over the long term, no net loss of groundwater in storage is anticipated.

1. Water usage for the Eagle Mountain Pumped Storage Project was based on the information provided to FERC by the Eagle Crest Energy Company in the Responses to Deficiency of License Application and Additional Information Request dated October 26, 2009.